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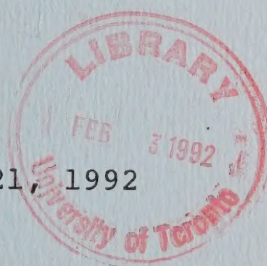


Ontario

ENVIRONMENTAL ASSESSMENT BOARD

VOLUME: 343

DATE: Tuesday, January 21, 1992



BEFORE:

A. KOVEN Chairman

E. MARTEL Member

FOR HEARING UPDATES CALL (COLLECT CALLS ACCEPTED) (416)963-1249

EARR
ASSOCIATES &
REPORTING INC.

(416) 482-3277

2300 Yonge St., Suite 709, Toronto, Canada M4P 1E4

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HEARING ON THE PROPOSAL BY THE MINISTRY OF NATURAL
RESOURCES FOR A CLASS ENVIRONMENTAL ASSESSMENT FOR
TIMBER MANAGEMENT ON CROWN LANDS IN ONTARIO

IN THE MATTER of the Environmental
Assessment Act, R.S.O. 1980, c.140;

- and -

IN THE MATTER of the Class Environmental
Assessment for Timber Management on Crown
Lands in Ontario;

- and -

IN THE MATTER of a Notice by The Honourable
Jim Bradley, Minister of the Environment,
requiring the Environmental Assessment
Board to hold a hearing with respect to a
Class Environmental Assessment (No.
NR-AA-30) of an undertaking by the Ministry
of Natural Resources for the activity of
Timber Management on Crown Lands in
Ontario.


Hearing held at the offices of the Ontario
Highway Transport Board, Britannica Building,
151 Bloor Street West, 10th Floor, Toronto,
Ontario, on Tuesday, January 21st, 1992,
commencing at 9:00 a.m.

VOLUME 343

BEFORE:

MRS. ANNE KOVEN
MR. ELIE MARTEL

Chairman
Member



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University of Toronto

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I N D E X O F P R O C E E D I N G S

<u>Witness:</u>	<u>Page No.</u>
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Direct Examination by Mr. O'Leary (Cont'd)	59808
Cross-Examination by Mr. Freidin	59941
Scoping Session	59976-59986

I N D E X O F E X H I B I T S

<u>Exhibit No.</u>	<u>Description</u>	<u>Page No.</u>
2047	Document titled Basic Soil Interpretations for Forest Development Planning, Surface Soil Erosion and Soil Compaction, authored by Carr, Mitchell and Watts, dated October 1991.	59810
2048	Map entitled the Generalized Physiographic Regions of British Columbia, taken from Ecosystems of British Columbia.	59827
2049	Excerpt from a document entitled A Decision Model to Predict Sediment Yield From Forest Practices, authored by R.J. Burns and J.D. Hewlett, dated February 1983.	59907
2050	Excerpt from a document entitled WEPP, A New Generation of Erosion Prediction Technology authored by John Laflen, Leonard J. Lane and George R. Foster.	59916
2051	Excerpt from a document entitled Journal of Forestry, Official Organ of the Society of American Foresters authored by George R. Trimble and Richard S. Sartz.	59931
2052A	Page V, the Forward, of Rowe's Forest Regions of Canada.a	59947
2052B	A map which accompanied Rowe's Forest Regions of Canada.	59950
2052C	Pages 158 and 159 of Rowe's Forest Regions of Canada.	59950

I N D E X O F E X H I B I T S
(Cont'd)

<u>Exhibit No.</u>	<u>Description</u>	<u>Page No.</u>
2053	Page 110 of Phillip's Atlas of Canada and the World.	59954
2053A	Page 10 of Phillip's Atlas of Canada and the World.	59960
2053B	Page 104 of Phillip's Atlas of Canada and the World.	59960
2052D	Page 160 of a document entitled Canada's Major Soil Zones and Regions, authored by Rowe.	59962
2054A	One-page excerpt, Figure 9, from Agriculture Canada's publication Soils of Canada.	59964
2054B	Map entitled Soils of Canada.	59965
2055	Excerpt of a thesis submitted to the Department of Forestry from the University of Toronto in 1978 entitled Mechanical Site Preparation in the Boreal Forest of Canada with Special Reference to Ontario, authored by Richard A. Kelertas.	59967
2056	13-page article by Morrison and Williams entitled The Distribution of Slopes in British Columbia.	59975

1 ---Upon commencing at 9:30 a.m.

2 WILLIAM WADE CARR; Resumed.

3 MADAM CHAIR: Please be seated. Good
4 morning, Dr. Carr.

5 DR. CARR: Good morning. By my body time
6 it's very early in the morning. This three hour-time
7 adjustment, it takes more than a couple of days to
8 really get over it. I will be ready by the time I go
9 back.

10 MR. O'LEARY: Good morning, Madam Chair.

11 MADAM CHAIR: Good morning, Mr. O'Leary.

12 MR. O'LEARY: I just have two preliminary
13 matters, if I may proceed. Under Tabs 3 and 4 of the
14 witness statement document, which is 2041, there are
15 two tabs that the Coalition indicated they would be
16 updating and we have placed before you a copy of the
17 updated exhibits reviewed by Dr. Carr and I would ask
18 that that be marked as an exhibit. That's the update
19 for Tab 3.

20 MADAM CHAIR: Do you want a number for
21 this, Mr. O'Leary, or do you want us to put it in our
22 books?

23 MR. O'LEARY: All right. I am happy to
24 put it in the books if that's generally what has been
25 done.

1 MADAM CHAIR: That's fine. Then the
2 short list is Tab 4?

3 MR. O'LEARY: Well --

4 MADAM CHAIR: The transcript list is
5 tab...

6 MR. O'LEARY: Four. The exhibit list is
7 Tab 3.

8 MADAM CHAIR: All right, thank you.

9 MR. O'LEARY: Thank you.

10 CONTINUED DIRECT EXAMINATION BY MR. O'LEARY:

11 Q. Dr. Carr, when we broke yesterday one
12 of my last questions involved the question about the
13 validity testing that has taken place with respect to
14 the system that you have adopted in British Columbia
15 and you spoke at some length about the workshops and
16 what's taking place there.

17 Can I ask you whether or not there has
18 been any validity testing in another fashion that's
19 been conducted -- I give an example of any field
20 testing. Can you respond to that, sir?

21 A. Yes, I can. There are a couple of
22 other ways that we've been dealing with testing the
23 validity of the system in British Columbia.

24 Aside from the field testing, the trials
25 that we have done within the workshops to see if

1 everybody is agreeing, it was the most convenient way
2 to go out and look at about 40 sites in detail. There
3 is a considerable amount of work in our baseline
4 surveys which I talked about, to go back to blocks that
5 have been recently been harvested to see how effective
6 the guidelines are and are the impacts along the order
7 of magnitude that people were expecting.

8 There is also -- or there has also been a
9 fairly extensive peer review of the manual and the
10 process. The Land Management Report 63, which I was
11 the senior author, goes into detail as to how, what was
12 the process that we went through to come up with the
13 keys and what is the basis for them for particularly
14 only soil erosion and soil compaction.

15 There is another Land Management Report
16 62 which is authored primarily by Dr. Terry Lewis who
17 is sort an associate in the project. That is currently
18 being published right now. The final draft has been
19 approved and it was supposed to come out before 63, but
20 62 is a little bigger document. They are able to put
21 63 through the printer quicker. So there has been some
22 extensive peer review as well as ongoing monitoring.

23 Q. Dr. Carr, at your request you asked
24 us to make a number of copies of the Land Management
25 Report No. 63?

1 A. Yes, I did.

2 Q. Is the full title of that document
3 Basic Soil Interpretations for Forest Development
4 Planning, Surface Soil Erosion and Soil Compaction?

5 A. Yes, it was.

6 Q. Are you one of the authors of that
7 document?

8 A. Yes, I am.

9 Q. Do you have a copy in front you?

10 MADAM CHAIR: Do you want an exhibit
11 number for this, Mr. O'Leary?

12 MR. O'LEARY: Yes, Madam Chair.

13 MADAM CHAIR: This article will be
14 Exhibit 2047 and Mr. O'Leary gave the title of the
15 article. The authors are Carr, Mitchell and Watts and
16 the date is October 1991 for the B.C. Ministry of
17 Forests.

18 MR. O'LEARY: Also referred to as Land
19 Management Report No. 63 on the actual title page.

20 ---EXHIBIT NO. 2047: Document titled Basic Soil
21 Interpretations for Forest
22 Development Planning, Surface
23 Soil Erosion and Soil Compaction,
authored by Carr, Mitchell and
Watts, dated October 1991.

24 MR. O'LEARY: Q. Dr. Carr, are there any
25 portions of that report that you want to take us to

1 directly or have you already summarized the report?

2 A. I don't think it's necessary to go to
3 it directly. It was just to show the type of process
4 we went through to develop the keys and the background
5 search that went into and some of the development and
6 the philosophy behind what we did as well.

7 Q. All right, thank you. Can you tell
8 me, what steps were necessary to implement the approach
9 that you have now adopted in British Columbia?

10 A. There were a series of steps that we
11 went through after we had gotten to the point of
12 determining the standards of the Interior Forest
13 Harvesting Council and coming up with the field guides
14 and the manuals.

15 I have discussed a bit about that we have
16 put a lot of effort into the educational component
17 with, as I said, the workshops that we have given
18 specifically on site degradation.

19 Can you see that okay?

20 MADAM CHAIR: Yes, we can, Dr. Carr.

21 THE WITNESS: What we have done
22 specifically with the site degradation issue, but also,
23 as I said, we are now looking at -- there has been
24 developed a workshop for the contractors and the
25 operators because we felt that was very important.

1 They are the ones doing the work.

2 Probably the biggest driving force has
3 been the regulations or they are coming out now as the
4 standards. With the standards that are currently
5 interim and soon to become final, there is a regular
6 monitoring program that we have gone through to come up
7 with a system that can be used and there are also that
8 will accompany the final version of the standards a
9 series of penalties.

10 The final form of the penalty mechanism
11 is still a little bit under debate. I believe they are
12 ready to release the entire document sometime this
13 spring.

14 The issues, the methods that have been
15 discussed within the penalty mechanism have been
16 reductions in cut to a company or organization that has
17 shown to be out of compliance. There will probably be
18 most definitely be a specific charge for site
19 rehabilitation -- you know, more of a court order: You
20 shall fix this or you shall undertake these operations
21 and the violator would have to absorb the cost and
22 they're also considering a form, I have seen one draft
23 but I don't know if it will finally get through, a form
24 of treating site degradation like a forest trespass.

25 Like, you have cut somebody else's wood.

1 You have taken the wood out of somebody's future cut
2 and a charge, like a double or triple stumpage charge
3 of the equivalent production of the area that you have
4 dealt with in exceedance.

5 Now, the procedures and the fine points
6 of that are, I believe -- I know they are within the
7 timber and silviculture branch right now. I believe
8 that they have come out of the Interior Forest
9 Harvesting Counsel. I think they are just clarifying
10 the legal components of implementing a penalty
11 mechanism.

12 The approach both through education and
13 the planning and the field guides will really deal with
14 it, but there is an accountability behind that in the
15 standards and the penalty mechanism.

16 Q. Dr. Carr, I believe you spoke to it
17 briefly yesterday in response to another question,
18 perhaps you could just refresh us a little, against
19 whom is presently proposed that these penalties be
20 imposed or what level do you envision they will be
21 imposed?

22 A. The current plan is to penalize the
23 violater for any -- whether it is an operator, a
24 company, whoever has the licence, the licensee or a
25 small business operator should that be the case, an

1 open bid, it is the organization responsible for the
2 development of the pre-harvest silviculture
3 prescriptions and the logging plan. Whoever signs,
4 seals that document has the ultimate responsibility.

5 Q. All right. Now, based on your
6 experience in British Columbia, Dr. Carr, how long do
7 you estimate in terms of time would you think that is
8 reasonable to allow for the implementation of a similar
9 approach in Ontario?

10 MR. FREIDIN: Can we just clarify whether
11 we are talking about development of which part of this
12 whole process? Are we talking about development of the
13 keys, the hazard ratings or the implementation that you
14 are talking about now?

15 MR. O'LEARY: Well, Madam Chair, I think
16 that's exactly what he is going to address in this
17 question is the various aspects that need to be
18 developed or whether or not there is a possibility that
19 we can rely on some of the work that's been done in
20 British Columbia and that will effect time.

21 MADAM CHAIR: Your evidence yesterday,
22 Mr. Carr, was that it has been about 10 years of
23 various pieces of work leading up to the system that
24 you are describing today.

25 I think Mr. Freidin would be satisfied if

1 we started from those first steps. Are we talk about
2 from the first step taken towards moving in this
3 direction, what do you see happening or how long -- is
4 that your question, Mr. O'Leary, how long would it take
5 to institute such a system in Ontario?

6 MR. O'LEARY: That's it.

7 MR. FREIDIN: I just want to know what he
8 is talking about implementing, what steps he is talking
9 about that's necessary.

10 MR. O'LEARY: Perhaps Dr. Carr can
11 explain that, then.

12 THE WITNESS: I will take you to what I
13 think would be the process of, you know, collapsing
14 what we have done since it was a 10-year program and
15 various things developing.

16 In regards to developing a site
17 sensitivity component, a similar type system, I think
18 the basis is already there, as I had mentioned
19 yesterday in the forest ecosystem classification
20 system. There are already hazard indices. It would be
21 a matter of applying them at the scale or verifying.

22 When I looked at them there was no
23 documentation as to how these sensitivities or these
24 hazards were derived. I know there are a lot of fairly
25 similar concepts.

1 I think fundamentally it would just be a
2 testing or proving that situation. I think that can be
3 done very quickly; not much more than the year to
4 really try and address. So you could get, I think,
5 within maybe two years to the point of being able to
6 come up with the site and overall site sensitivity. It
7 may be just a matter of adopting the current keys.

8 With regards to going farther, the
9 monitoring component that we have and we currently use
10 in British Columbia, that was a lot of the background
11 work that was done and I believe that the system is
12 very well adoptable to Ontario since it is a fairly
13 generic monitoring system. They are considering it in
14 Alberta at this time and they're also considering using
15 it in Oregon and Washington.

16 The long-term or the predictive component
17 of road impacts, that will take some research, both
18 getting an initial step from doing some retrospective
19 studies that may take one or two years to come up with
20 a reasonable first estimate of the projected losses
21 associated with the type of degradation that we're
22 dealing with, then the educational component, fairly
23 straight forward. When we had reached that point it
24 took six months for us to develop the training package.

25 In regards to coming up with a

1 guideline -- I mean, the standards, well, that becomes
2 an administrative function. They can be set now or it
3 just depends upon the direction that you have or are
4 given.

5 Q. Dr. Carr, 10 years ago, how would you
6 describe the availability of information or the
7 knowledge in British Columbia with respect to site
8 degradation?

9 A. There was very little information 10
10 years ago. A number of -- at least there were a number
11 of research studies, but not a great number. I only
12 remember -- 10 years ago there would have probably been
13 less than 20 studies, but it was enough to trigger
14 among not only the people that were doing the research,
15 of which I was one, but some of the regional
16 pedologists and managers. There were definitely
17 problems there. So there wasn't a lot at that time.

18 Q. Dr. Carr, is there any similarity
19 between the situation that existed 10 years ago in
20 British Columbia and the situation presently in terms
21 of the quantity of information available and your
22 knowledge of site degradation?

23 A. There has been a radical change and
24 tremendous improvement in our understanding. I have
25 discussed in the past some of the research, but as I

1 had said yesterday, it is well over \$2-million worth of
2 research on an ongoing research program.

3 Within the Ministry of Forest Research
4 Branch there is specific site degradation and
5 rehabilitation committee and they direct the research
6 and answer specific field questions.

7 Q. Do you have any opinion as to the
8 extent, if any, of that information or knowledge that
9 presently exists in B.C. which could be used in Ontario
10 for purposes of the undertaking in discussion of this
11 hearing?

12 A. Yes. I think a great deal of it can
13 be transferred very rapidly. Since most of the work in
14 the interior regions of British Columbia and the areas
15 where we have done the most amount of research are,
16 say, in the Prince George/Caribou regions which are all
17 within the boreal forest; matching the terrains, that
18 sort of thing. So I think a lot of the research would
19 be directly applicable.

20 We have also done and worked through a
21 lot of the background of -- particularly with the
22 monitoring system. How do you go out and measure in a
23 reasonable fashion. We went through, I believe at last
24 count there were eight different systems to come up
25 with what we feel to be an operational system that is

1 working and that -- you know, a lot of the background
2 and the basis of the studies are there. It would just
3 be a matter, from a scientific standpoint, looking at
4 transferring some of the information, gathering some
5 local data to try to fit in.

6 Q. And if you - and this is the in the
7 hypothetical - if you were put in charge of
8 implementing a regime or a system like British
9 Columbia's in Ontario and you were put in charge
10 tomorrow of that, you were the one charged with the
11 responsibility of putting it into effect, can you
12 estimate how long it would take starting tomorrow to
13 implement a similar approach in Ontario?

14 A. Based on my estimate, I will assume
15 that we are going to a final product level, I would
16 think around three years given the mandate and the
17 funding.

18 We have found in British Columbia that
19 one this thing got rolling we were able to gear up
20 quite quickly to start filling in the blanks. As I
21 say, it is an ongoing process that we are always trying
22 to improve the system and that's why there is an
23 ongoing research program.

24 Q. Given a substantial amount of
25 evidence in terms of the similarities between the

1 provinces and the fact that some of the information
2 transferrable, do you have anything else to say in
3 terms of why the time differential is so great?

4 A. The time differential...

5 Q. It has been 10 years to develop the
6 approach in British Columbia and now you are saying if
7 we started tomorrow it would only be three here in
8 Ontario. Why can we do it so much quicker?

9 A. Because much of the background
10 information has been -- there is a systematic framework
11 there. It's a matter of filling in some of the key
12 blanks and going to a very quick first level at it as
13 we did, but the background is there.

14 When the system is in place there would
15 have to be fine-tuning, dealing with some differences
16 in the management style regulations.

17 Our system is directed at a pre-harvest
18 silvicultural prescription. At a cut block level, your
19 silviculture guidelines are a five-year level. That is
20 where that is developed. You would have to do some
21 rectification there. It is just the background is
22 there and the system is operating.

23 MADAM CHAIR: Excuse me, Dr. Carr. I
24 don't think it's clear to the Board yet what it is that
25 your system does.

1 In other words, as you have admitted,
2 much of what we do in Ontario is comparable to
3 knowledge that you have about soil degradation in
4 British Columbia and you seem to be suggesting that in
5 Ontario we repackage that knowledge in some way so that
6 it comes out looking like this. What would be the
7 advantage to Ontario in doing that?

8 Secondly, have you investigated the way
9 that we -- in Ontario emphasis seems to be put on
10 repairing damage. In other words, there is a provision
11 that sites must be regenerated. If they are not
12 regenerated successfully the first time under the FMA
13 program, then the license holder regenerates it at his
14 own expense.

15 So I guess the question -- Mr. Martel and
16 I have been discussing your evidence obviously and our
17 questions are those two points. One, are you asking
18 Ontario just to repackage information it already has
19 into a system you are using in British Columbia and
20 then are you -- because what you want to do is you want
21 to repair sites. You can spend all kinds of money on
22 knowing something, but you want those sites to
23 regenerate; you want the landings and the skid trails
24 and so forth to regenerate.

25 So I guess the Board is saying, if you

1 have an opportunity to spend money on investigating a
2 problem versus spending money on fixing the problem,
3 where do you go?

4 THE WITNESS: I will address the
5 questions sequentially.

6 I can't say that I'm asking directly that
7 you repackage, but I think we have a system that can --
8 I wouldn't say repackage, but I think it can be
9 adopted, much of the information, very quickly.
10 Repackage just -- repackage with a lot of fine-tuning.

11 MR. MARTEL: Can you stop there. What do
12 you mean by fine-tuning?

13 You see, we talked about last night and
14 we talked about this morning because we are trying to
15 get what the significant difference is in the whole
16 scheme. It doesn't look all that complex in over 10
17 years to arrive at something that's supposed to be a
18 panacea for all of our problems out there.

19 THE WITNESS: I don't believe it is a
20 panacea.

21 MR. MARTEL: Well, the wording might
22 be -- I asked yesterday about how far you take it
23 beyond the FECs because we thought FECs was a very
24 important step that is being adopted now.

25 What's the fine-tuning after that then

1 that comes into play?

2 THE WITNESS: We have gone fine-tuning
3 down to your operational level, when you are out there
4 on a cut block. I will discuss a little bit later
5 about the prescription formulation component, the
6 mitigation/prevention thing.

7 The fine-tuning is more from a structural
8 standpoint, that our forest planning system is -- there
9 are some similarities, but the approaches are a little
10 bit different of when you do things.

11 In British Columbia we don't look at
12 timber supply planning. That is just a component of
13 forest management planning. They created a whole new
14 section of the Forest Service called Integrated
15 Resource Management and that's where the linkage comes
16 between timber supply and the other resources.

17 Fine-tuning, it's matching it to the
18 system and structure that you have, drawing from what I
19 would think the comparable -- I mean, look at our
20 research and see what are comparable soils, comparable
21 slopes, comparable ecosystems. You can make a first
22 approximation off of that and, you know, you start with
23 your first approximation, implement, monitor and then
24 you can go back to it. That is my approach.

25 You have to start somewhere and once you

1 have that as far as -- you also have to have some type
2 of political direction. You know, an objective to get
3 things going.

4 We found that the mention -- when we
5 first began even addressing the issue and the issue of,
6 there is going to be standards on the degraded sites
7 and, as I say, they are not even final now, but the
8 interims were introduced in May of 1990. There has
9 been a dramatic turnaround in everybody's perspective
10 in addressing the issue.

11 So you put a standard and work to see if
12 the standard is real and achievable, and we have found
13 that it was a great motivator within British Columbia
14 to improve practices.

15 In regards to the second --

16 MADAM CHAIR: Just one question, Dr.

17 Carr.

18 THE WITNESS: Yes.

19 MADAM CHAIR: You have made the
20 difference between the forests on the coast of British
21 Columbia and in the interior of British Columbia, but
22 at the same time the political system started to pay
23 attention in British Columbia because of incidents that
24 involved steep slopes, whether that was visible erosion
25 or landslides or rather larger episodes than -- that

1 weren't subtle effects.

2 THE WITNESS: Unfortunately -- well,
3 British Columbia is split up very -- there are two
4 very distinct regions between coastal forestry and
5 interior forestry.

6 MADAM CHAIR: Mr. Martel and I have both
7 travelled to British Columbia and we are still trying
8 to figure out where the flat parts are.

9 THE WITNESS: The flat parts? They are
10 in Prince George, believe me. As a friend of mine said
11 the first time she went up there: Now I see what you
12 mean, there is nothing but trees and space and flat
13 ground.

14 MADAM CHAIR: What percentage of B.C.
15 forests is the flat area, the plains as you call them?

16 THE WITNESS: A substantial portion. I
17 couldn't guess. I could give you a -- we have a map
18 available to show the physiographic regions of the
19 central and the interior plateau. We can give that to
20 you now just as an idea.

21 MR. MARTEL: Dr. Carr, are you aware that
22 northern Ontario or parts of it -- when we first
23 started this hearing they used to talk about the
24 highlands and the lowlands and when we went to see it
25 we found there was two feet difference between the

1 highlands and the lowlands and this goes on for miles
2 and miles and miles, hundreds of miles. You know,
3 so...

4 THE WITNESS: Northcentral, the interior
5 plateau is hundreds and hundreds of miles. It's an
6 extremely large area.

7 If you don't mind, they can introduce
8 this. There are -- this is a map that I have taken out
9 of the Ecosystems of British Columbia to deal with the
10 physiographic regions.

11 MADAM CHAIR: Shall we mark this an
12 exhibit, Mr. O'Leary?

13 MR. O'LEARY: Yes, please.

14 MADAM CHAIR: This will become Exhibit
15 2048 and it is entitled The Generalized Physiographic
16 Regions of British Columbia and I don't know what the
17 source is.

18 THE WITNESS: The source is Ecosystems of
19 British Columbia, February 1991 publication, Special
20 Report Series 6. It was compiled and edited by Dell
21 Meidinger, M-e-i-d-i-n-g-e-r, and --

22 MR. GREENWOOD: Would you spell it again.

23 THE WITNESS: Excuse me?

24 MR. GREENWOOD: Spell again, please.

25 THE WITNESS: M-e-i-d-i-n-g-e-r and Jim

1 Pojar, P-o-j-a-r. This is the latest compilation of
2 what is equivalent to our FEC system. It deals with
3 all the ecosystems throughout British Columbia.

4 MR. MARTEL: What was the date?

5 THE WITNESS: February 1991.

6 MR. MARTEL: Thank you.

7 ---EXHIBIT NO. 2048: Map entitled the Generalized
8 Physiographic Regions of British
9 Columbia, taken from Ecosystems
of British Columbia.

10 THE WITNESS: To assist you a little bit
11 when I discuss things. You see the interior plateau, a
12 broad level, I would hazard quickly that well over half
13 of that is these flatter areas and that's just a really
14 rough guess.

15 The great plains component up in what
16 would be the northeast corner is nothing, in my mind,
17 but flat ground. That is the Peace River country and
18 in many ways you might as well be in Alberta, and then
19 there are some components of the north and central
20 plateau, that is up in the middle at the top of the map
21 that obviously deal with the sort of flat areas.

22 The interior plateau which is sort of
23 centered around Prince George area is the most
24 extensively logged area in British Columbia on an areal
25 basis. You get more wood volume off the coast because

1 of the difference in -- in the interior they may get
2 200, 250 cubic metres of pine per hectare, on the coast
3 they get, you know, 750, 800 cubic metres of Doug fir
4 cedar. There is a tremendous difference.

5 Just to give you some idea of the
6 relative percentages that frames things a little bit
7 better. The interior plateau is where almost all -- a
8 great deal of the research has been undertaken with
9 dealing with flat ground. That includes the
10 Kamloops -- I mean, a bit of the Kamloops Forest
11 region, Caribou Forest region and Prince George Forest
12 regions and the interior component of Prince Rupert.
13 There are six forest regions in British Columbia --I
14 mean, forest districts.

15 In regards to the second question that
16 you brought up in respect to concerns came from the
17 highly visible erosion on the coast, that's true to an
18 extent of dealing with landslides and erosion and there
19 has been a great deal of work that has gone into that.

20 The concern in the interior, many people
21 thought when I first began my work that all the
22 problems were on the coast. Kamloops has a lot of flat
23 ground and it is bit dryer than sort of the southern
24 end there, a lot dryer.

25 To give you an example. In about 1978 or

1 '79 after I had been working on the coast on erosion
2 and under contract to the Forest Service I went to the
3 head engineer, head forest engineer for the Kamloops
4 Forest region to discuss with him sediment and erosion
5 control issues and he told me explicitly that we do not
6 have erosion problems in the Kamloops Forest region.
7 Those are only the coast where you get high rainfall.

8 It's one of these things that you sort of
9 stick in your mind when you are young out there
10 starting this. We discussed farther and he said:
11 Well, we just have erosion -- we just have boulders and
12 cobbles left.

13 He couldn't explain to me what happened
14 to the material that used to be between the boulders
15 and cobbles, but his perspective was they didn't have a
16 problem. There was in the late 70s.

17 Fortunately, there was a new pedologist
18 that came in and a lot of work went on, but the issue
19 of the soil compaction has always been a focus of the
20 pedologist and the researchers I think for quite some
21 time. When you look at some of the first
22 approximations of our forest ecosystem classification,
23 there are erosion and compaction indices very similar
24 in nature to the ones you have. We have just worked
25 and worked on that.

1 As here, there is obviously some concern
2 or they wouldn't be in the guidelines. It's just a
3 matter of trying to establish the magnitude and extent.
4 It was all visible. There was beginning -- because of
5 some of the early research that was done there began to
6 be a concern on potential impact on long-term
7 productivity.

8 MR. O'LEARY: Q. Dr. Carr, I am going to
9 ask you several questions that flow out of the several
10 questions from Madam Chair and Mr. Martel.

11 Can I ask you whether or not you have any
12 opinion as to whether Ontario has the same level of
13 concern about compaction as British Columbia?

14 Is there anything in the evidence before
15 the Board here that would give you the indication that
16 Ontario has the same level of concern about compaction
17 as British Columbia?

18 A. At the present time there's a major
19 difference in the approach and obviously the amount of
20 concern.

21 You know, it has been recognized through
22 the FEC system, so that there is obviously some level
23 of concern and there are some general guidelines to
24 minimize, but there are no specific targets which is
25 where we have gotten to.

1 Q. All right. Can you tell me, what's
2 the level of analysis or studies that have been
3 performed in Ontario in comparison to the amount of
4 work that's been done in British Columbia in respect of
5 compaction?

6 A. Aside from the Schuman, McIntosh
7 paper that has already -- I believe MNR presented in
8 their case, and that's the only study that was brought
9 forward to me and I have been aware of specifically
10 looking at compaction that has been published to my
11 knowledge, the inclusion of the hazard keys and the
12 forest ecosystem classification - although I don't know
13 how the keys were drawn or what their basis were -
14 obviously some thought and some process has gone in to
15 trying to look at the various soil types as they have
16 been classified and give them an initial rating.

17 There is not a great deal that I'm aware
18 of looking at the specific impacts of compaction on,
19 say, tree growth compaction on bulk density.

20 Q. When you say you are not aware, just
21 so we can put this in context, your qualifications
22 indicate that you are perhaps a preeminent authority on
23 the subject of site degradation. Am I going too far?

24 A. I would never use preeminent.

25 Q. Certainly well established in the

1 field.

2 A. I have done a considerable amount of
3 work, yes.

4 Q. Your evidence has also been that site
5 degradation issues are not specifically the domain or
6 concerns only of British Columbia, it is something that
7 transcends provincial boundaries, for that matter
8 national boundaries?

9 A. Absolutely. And, again, the work
10 that was presented in one of the exhibits by MNR
11 dealing with soil compaction, there is a reference to a
12 Braiken and Sands article and that is a review, I
13 believe, of well over a hundred articles throughout the
14 world on the impacts of compaction on tree growth and
15 the resource. That's a 1981 journal article.

16 So there's obviously awareness that it
17 is -- anybody to read that review would have to get an
18 indication that it is a very widespread, pervasive
19 problem.

20 Q. You have answered my next question.
21 It was simply, it is part of your job then to consider
22 any field studies or any analysis that's performed
23 outside of British Columbia in respect to site
24 degradation as well as what happens in B.C.; correct?

25 A. Yes, very much so. Some of my work

1 has been specifically for the Ministry of Forests who
2 compile annotative bibliographies of soil compaction
3 research.

4 Q. So if there was recognizable analysis
5 or reliable studies that have been done in Ontario on
6 the subjects of compaction and soil erosion, can you
7 give us an idea what is the likelihood that you would
8 have seen them or heard of them?

9 A. I would hope that I would have a high
10 likelihood or I'm not doing my job right, but I have
11 not really heard any lately. There may be something in
12 the last couple of years. It has been a while since I
13 have done a fairly extensive literature survey.

14 Q. Can you tell me, have you formed an
15 opinion as to whether Ontario has adopted a systematic
16 approach like they have in B.C. to deal with site
17 degradation? Have you formed an opinion in respect of
18 that?

19 A. From what I've been able to
20 ascertain, they do not done the scale of systematic --
21 or the approach that we have. It is considered through
22 the FEC system of giving some type of constraint or at
23 least identifying a constraint to timber harvesting
24 operations. That's all that I know of.

25 Q. Can you tell me, is there any sort of

1 guideline of which you are aware of in Ontario which is
2 enforceable like the guideline that you referred to in
3 British Columbia?

4 A. Not that I'm aware of.

5 Q. Is there set of penalties of which --
6 or a proposed set of penalties for Ontario like the
7 proposed set of penalties that is being considered for
8 British Columbia for those what violate the guideline?

9 A. None to my knowledge.

10 Q. Is there any system for predicting
11 effects of site degradation which is similar to that
12 which is presently in force in the Province of British
13 Columbia?

14 A. Not that I've been able to ascertain,
15 no.

16 Q. All right. Is there any system in
17 Ontario that you are aware of that looks at site
18 degradation and relates it backs to the impact on
19 future wood supply like you indicate exists in the
20 Province of British Columbia?

21 A. I'm not that familiar with the timber
22 supply planning system that you have with regard to the
23 intricacies of projecting wood supply. So I really am
24 not qualified to answer that.

25 Q. That's fair enough. When we look at

1 all of your responses and all the evidence before you,
2 Madam Chair and Mr. Martel asked you whether or not
3 what you are suggesting for Ontario is simply a
4 repackaging of what has been done in British Columbia
5 in respect of site degradation.

6 Is repackaging a way of characterizing
7 what you are suggesting is appropriate for Ontario?

8 A. As I mentioned to Mr. Martel, the
9 word repackaging -- it is, I guess, loosely a
10 repackaging of the material with appropriate
11 adjustments made to fit the forest planning and the
12 forest management system that you have in this
13 province.

14 Q. By repackaging, are you indicating
15 you are taking the B.C. package --

16 MR. FREIDIN: Why don't you ask him what
17 he means by repackaging as opposed of putting words in
18 his mouth.

19 MR. O'LEARY: Q. By repackaging, are you
20 referring to the B.C. package or the Ontario package?

21 A. Obviously I would be referring to the
22 B.C. package which is more extensively developed.

23 Q. Thank you. May I ask, if I
24 understand it correctly, you are repackaging the B.C.
25 package and applying it to Ontario?

1 A. I would look at moving the components
2 that are directly applicable to the type of terrain and
3 soils that you have here.

4 Q. All right. That's the repackaging?

5 A. The first stage, yes.

6 Madam Chair, there was a component of
7 your earlier question which I sort of skipped over and
8 I didn't really wish to -- you had asked about the
9 direction in Ontario seems to be at repair as opposed
10 to maybe prevent, that areas have to be put back into
11 production.

12 With regards to the repair of degraded
13 sites, it is just -- we're not talking about problems
14 with just getting trees growing back. We're talking
15 about some very substantial problems with getting trees
16 growing back or some substantial impacts.

17 I have gone a lot of work in soil
18 rehabilitation and erosion control. It has always been
19 far, far cheaper to plan and prevent than to deal with
20 always reparation. Any time I have been involved in a
21 a reparation project, whether it is of soil compaction
22 or sediment and erosion control, the costs can be very
23 high.

24 You already incurred the immediate
25 impact -- you have incurred some of the impact already

1 and there are times when rehabilitation does not get
2 you back to where you were and there's also time when
3 rehabilitation is not feasible to get back to any
4 erosion control particularly.

5 I did this once to -- you wanted me to
6 deal with an erosion problem from a forest road that
7 they had created and we figured by the time to
8 restabilize part of the till slide it would cost them
9 around 6- or \$700,000 because we would have to give it
10 to a geotechnical -- like a road engineering solution
11 if we were to fix it. The guy looked at me and said:
12 We only spent \$100,000 to build the road.

13 We sort of went -- the geotechnical
14 engineer went: Well, if you had built your road
15 another 60 feet higher up on this bench you wouldn't
16 have caused the problem.

17 So you are far better off to deal with
18 the planning component of prevention as to ever get
19 into, you know, deal with things after the fact. Not
20 only from the impacts, but also just from a pure cost
21 standpoint.

22 MADAM CHAIR: Of course in Ontario the
23 evidence before us is that the silvicultural
24 prescriptions do, in fact, attempt to avoid situations
25 where you would have -- I don't think timber management

1 planning goes out of its way to incur situations of
2 erosion or soil compaction and there are prescriptions
3 having to do with types of equipment and seasonal
4 operations and all those kinds of things.

5 THE WITNESS: Yes.

6 MADAM CHAIR: We are just trying to
7 understand what the advantage is with respect to your
8 system versus what they are doing in Ontario.

9 What help is your system to a forester
10 who is doing a timber management plan when in Ontario
11 he or she is looking at FECs, they are coming up with
12 silvicultural prescriptions based on if they are
13 operating in the Clay Belt in the northeast part of the
14 province they want high flotation tires and winter
15 harvest and all of that stuff?

16 What advantage would it be to that
17 forester to have your piece of paper instead of the
18 tools that they have now?

19 THE WITNESS: I have to sort of refer
20 back to the primary purpose. When we developed the
21 field guide, it was a planning aid to a forester and it
22 incorporates very much -- if you look through the --
23 and I have sort of gone through some of the FEC
24 documents and looked at the prescription of things, it
25 incorporates and embodies much of that.

1 The whole second half of that field guide
2 is for British Columbia. It outlines options and
3 considerations.

4 The main difference I guess is from the
5 establishment of a specific standard. In British
6 Columbia for a long time, it is the same as here, there
7 was a wide range of -- like, you know, under these
8 conditions use cable logging, wide tired skidders. We
9 have the same type of books, but it was found not to be
10 that effective when you can go continually and find and
11 still to this day -- you know, 1990, '91, '92 we were
12 finding -- I would be called out to do a survey and we
13 would be coming up with 26, 27 per cent.

14 Obviously, to us we found that we had to
15 get to the point of setting a standard, one that was
16 due to be achievable under generally -- and
17 incorporating good planning, best management practices
18 that are out there, but without that standard there
19 were economic conditions that superseded -- like, we
20 had to get the wood out or the contractor would go
21 broke.

22 I've heard probably every story that you
23 can ever think of why these were exceeded, but without
24 a standard there is not a strong impetus if there is no
25 way to go: This is our absolute, we will accept --

1 MADAM CHAIR: So the standard you are
2 referring to are not in the field guide, but -- well,
3 are the standards set for per cent of disturbance of
4 soil, area disturbed.

5 THE WITNESS: Yes, and that is a
6 regulatory piece that --

7 MADAM CHAIR: And those are the standards
8 you are talking about?

9 THE WITNESS: That's the 1990 to 1994...

10 MADAM CHAIR: So you feel that's the most
11 important difference between your approach which has a
12 field guide which helps foresters keep their operations
13 within an acceptable level of those standards?

14 THE WITNESS: From what I have seen over
15 the last -- over the decade that I've been dealing with
16 it, when even the thought or the interim version of
17 those standards, they were not forced -- you know, to
18 be in forced the first two years, but it was given to
19 industry and to the ministry because they had their own
20 harvesting that these are the limits you will get.

21 We have just seen a tremendous response
22 in the quality of the operation, the planning that's
23 going in and we have been able to move this -- as I
24 say, the planning -- we have found operators and I've
25 have talk to logging superintendents going and finding

1 that overall our logging costs are starting to drop
2 because of the guideline there, with the standard.

3 All of a sudden you no longer just
4 consider, there is an impetus there to plan better. He
5 found through better planning and not incorporating or
6 incurring degradation -- when you are out there on a
7 Cat or a skidder or whatever, it actually costs money
8 to cause deep rutting because it slows down your
9 production time. He was looking at it purely from a
10 production standpoint.

11 If the blocks were laid out properly and
12 the prescriptions -- you know, there was a little
13 effort there, and he didn't have a wet corner of the
14 block to deal with on a summer operation that should
15 have been winter, he didn't have to bring in a Cat to
16 pull out his skidder which was stuck in the mud, he
17 didn't have to build the extra landing.

18 This was a specific example of where --
19 you know, to have a logging superintendent who only
20 thinks of wood production was going, you know, almost
21 like: Thank you, we've gotten the front end planning
22 much better because people have to -- if the planner
23 doesn't do it right the logger can't do it right. You
24 know, it was forcing the planner to give him much
25 better layout, much better prescription. So it made

1 his task much easier.

2 It works all the way down, but it comes
3 down to, it was not until these standards really came
4 in that you could see a definite attitude change.

5 MR. MARTEL: By establishing the
6 standards you have forced better planning?

7 THE WITNESS: Yes, we have.

8 MR. MARTEL: Is it the standard or the
9 realization by people that if they were smarter and
10 planned better that they can save money?

11 THE WITNESS: Well, obviously, if they
12 were smarter and planned better they would save money.

13 Unfortunately, what we have found -- the
14 whole process of timber harvest and timber management
15 planning is very segmented. Within the Ministry of
16 Forests we have huge battles in getting this in, is the
17 fighting over whose jurisdiction site degradation came
18 in.

19 The timber branch in British Columbia
20 which controls the wood supply and the actual
21 harvesting, they were the the ones that were most
22 affected because they were the causes. If degradation
23 was going to occur they were the people doing -- you
24 know, it was in their bailiwick.

25 It is the silvicultural people who --

1 like, once you're off the site we deal with it. They
2 were saying - it was actually through the thrust of the
3 silviculture people who were tired of dealing with
4 messed up lands all the time - stop it.

5 I mean, you're talking about intelligence
6 there. You have people focus into their job and the
7 guys -- he saw himself as getting wood out
8 inexpensively. That's his goal. He is not going to
9 worry a great deal about the next guy down the line.

10 With regards to costs and even getting
11 into the operation level, many times when there is
12 pressure to get wood to the mill at a low cost it's
13 like that is my primary objective if you are the
14 operator and it's like those impacts are somebody
15 else's problem, but to keep my job, to keep my company
16 going I have to get the wood there cheaper because the
17 mill will only pay me "x" dollars to get the wood.

18 So there is a pressure component and
19 sometimes, as I said, it was an educational thing.
20 Some people were not really aware. There are wonderful
21 seminars out there on better planning can reduce costs,
22 but I view it as the alligator swamp scenario when you
23 are wading deep -- when you are fighting alligators it
24 is difficult to realize that you are actually there to
25 clean up the -- you know, to deal with the swamp issue.

1 It was just a matter of narrow focus.

2 Many of the operators, you know, were
3 aware of this, but the pressures were a logger can only
4 do -- you know, they rely on somebody else.

5 One of the unfortunate things with our
6 system in B.C., is there is no follow through. The
7 person doing the prescription, when they get down to
8 even the person laying out the block, a lot of that is
9 done on contract.

10 I know of too many instances where it's
11 done by not really highly -- not professional level.
12 There are technician level out there that go out in
13 this area, in a 350 hectare cut block or a 200 hectare
14 cut block or whatever, here are the boundaries off the
15 map, go lay it out, and they go out and they run the
16 boundaries without ever really investigating the site
17 and taking it that next step.

18 It's really more at the field level where
19 you have the greatest gains possible. At the planning
20 level, as you have, your silvicultural guidelines are
21 five years. You know, that begins to identify that
22 there are operational problems in that area and, you
23 know, that's really where the planning begins, the good
24 planning starts.

25 So I guess I've sort of rambled on a

1 little bit here, but it has been very important that it
2 has really been the standards that have made everybody
3 focus on that issue and not worry about: I'm the
4 logger, I'm just going to get the wood out. Now the
5 logger has to be aware that he is responsible for the
6 aftermath and responsible in a very direct way with
7 regards to...

8 I guess maybe one last sort of little
9 anecdote with regards to this, was the one that I
10 mentioned yesterday when a major company in an area
11 brought in all their operators to take them through the
12 system and said: If we give you the plan properly, you
13 better understand what we want because if you cause us
14 to be fined you're going to work for us any more.

15 It wasn't until these regulations started
16 coming in that that flowed through. Now the entire
17 flow-through system started to work, in my opinion.

18 MR. O'LEARY: Q. Dr. Carr, a moment ago
19 you made the analogy of a logger being concerned about
20 the aftermath of his activities.

21 I was wondering if you had an opinion as
22 to whether or not this logger would have such a concern
23 about the aftermath of these activities in the absence
24 of the enforceability provisions you mentioned are
25 going to be brought into -- well, the penalties will be

1 brought in later, but the enforceability aspects of the
2 the provision in British Columbia?

3 A. Yes, I do. I have dealt with many.
4 You know, throughout the years I have dealt with the
5 logger. I personally enjoy that component the most and
6 many of them are concerned.

7 They've come into our workshops and when
8 you are introducing them it is like: I'm a logger for
9 Wellwood of Canada and I'm really concerned about the
10 environment because I live here. Often when you get
11 them to the side they will go: I think that's great
12 because it's making my life easier. I feel better
13 about my job.

14 But when you are in times of quite
15 finances -- you know, downturn in the industry, costs
16 will often supersede many of their operations, you
17 know, many components of the operation. Guidelines
18 tend to fall by the side depending upon the drive
19 there.

20 Q. Dr. Carr, one final question. The
21 19-9-4 standards or levels which you have referred to,
22 do you have an opinion as to whether or not those
23 levels would be met in the absence of the underlying
24 process you've described exists in British Columbia?

25 A. Based on what we have seen in the

1 past, there are a lot of operations that do meet or
2 would meet these levels.

3 The problem is that there is also this
4 component that don't and it's always the ones that
5 exceed that cause you the greatest problem and the idea
6 is, how can we bring that segment of the operations to
7 expedite their drive to come back in and it would be
8 that component.

9 Many areas are well within the
10 regulations. What we have found in the surveys is that
11 going back looking at proper blocks that were assumed
12 to be properly planned, well thought out, done under
13 the right time of the year, the limits have been very
14 achievable. It is to get rid of the extenuating
15 circumstances.

16 It is unfortunate that, particularly with
17 regards to the impacts of the links between erosion and
18 compaction, that you only need one or two areas within
19 an entire drainage, let's say, with erosion that was
20 not looked at. You can look at a number of different
21 cut blocks, but it is the one bad cut block that gives
22 you the greatest amount of problem in sort of the
23 further down effects.

24 Q. Dr. Carr, I would now like to turn to
25 the issue of mitigation. Can I ask you whether or not

1 the effects of site degradation can be mitigated?

2 A. Yes, they can.

3 Q. Do you have any comments on that
4 subject?

5 A. The issue of mitigation which we have
6 really been talking about for the last few minutes is
7 that the mitigation is brought about through proper
8 planning and trying to prevent.

9 There are two components. One, you must
10 know your system and then using what you know of your
11 system you come into, you know, the two components of
12 mitigation, planning and prevention.

13 The third being rehabilitation of those
14 areas that you recognize are going to -- you know, you
15 are going to have to deal with. You are going to have
16 to deal with erosion on the roads, you must have roads.
17 There can be cut bank erosion. So you will have to
18 deal with that and to me that's a rehabilitation
19 component.

20 Q. Dr. Carr, can I turn you to your
21 response to question 43 in the witness statement where
22 you indicate that rehabilitation must be decided prior
23 to harvesting. That's in the fourth paragraph, last
24 sentence of your response to question 43 at page 24.

25 Can I ask you, at one point in the timber

1 management process is this decided in British Columbia?

2 A. The need to rehabilitate, and there
3 are general guidelines that are out that all landings
4 and major skid roads should be rehabilitated at the end
5 of the harvesting operation. They are broad guidelines
6 on a regional basis. They specify the type of
7 procedures to be undertaken.

8 The reason for the inclusion of that is
9 that you have to make rehabilitation feasible. Our
10 procedures for full landing rehabilitation is to put it
11 back into production. I believe it is on page 17 under
12 Tab 7 where we talk about - no, I'm sorry, it is page
13 18 and 19 under Tab 7 - a series of steps to be
14 undertaken.

15 If you want to do full rehabilitation
16 there must be some aspect of dealing with the nutrients
17 and the topsoil that you are removing. You are blading
18 off the clearest open space where the deck logs are
19 around.

20 You have to plan ahead if putting that
21 topsoil material -- if you want to put it back on you
22 have to plan ahead. You have to know that as you are
23 going into the harvesting operation. You have to know
24 the level, if it's achievable, then I will put the
25 topsoil there, you know, to make sure it doesn't

1 interfere with the logging operations, but also that it
2 is recoverable.

3 What we have found often is if it's
4 spread around, then you just operationally cannot put
5 it back on if it's spread around. If you are on
6 anything over a 30 per cent slope, there is no way that
7 I know of economically to put that material back on
8 because you have pushed it over, and we have tried and
9 it's eaten up hours of Cat time to put the topsoil back
10 on and realized that that was unrealistic.

11 In those instances we went to looking at
12 the use of nitrogen (inaudible) species to try to
13 rebuild the nutrients, but we recognize that as a --
14 what we call a partial rehabilitation.

15 So you have to make that decision early
16 on now at the pre-harvest silvicultural prescription
17 stage where we are getting into the -- you know, and
18 getting closer. That's part of the logging plan that
19 is submitted where the landings are located and
20 identified.

21 If there are seven or eight landings in a
22 150 to 200 cut block, they will go landings 1, 3 and 8
23 based on the criteria for the Kamloops Forest region
24 and there would be full rehabilitation of landings; 2,
25 5, 7, whatever they are, they do not meet those

1 criteria and they will be rehabilitated in regards to
2 the partial rehabilitation guidelines. We split the
3 two. That is where it is brought in. That way they
4 can plan the location of the landings and the way they
5 are constructed to make it feasible to undertake all
6 the steps under full landing rehabilitation.

7 Q. Dr. Carr, continuing on with your
8 response to question 43, you indicate at the bottom of
9 page 24, you state at that:

10 "There are four harvesting method
11 strategies that can applied to limit site
12 degradation resulting from yarding and
13 skidding..." and you identify equipment
14 choice, modifying or constraining equipment use,
15 scheduling of activities, rehabilitation measures.

16 On page 25 the very last paragraph you
17 state:

18 "While these four components are
19 important on a site-specific basis,
20 proper planning on a watershed or
21 management unit basis is necessary to
22 optimize both road and harvest pattern
23 layout consideration."

24 My question is, can you elaborate on why
25 this is necessary?

1 A. The rationale for that statement
2 comes from what we have seen often in British Columbia
3 where we have maybe more well defined smaller
4 watersheds. You were talking earlier, sir, that you
5 have fairly broad sweeping areas, but many times in
6 trying to diversify your harvesting pattern, if it's
7 not properly planned out of where you are going to go,
8 you may -- we had found it can present severe
9 challenges to the completion of the logging of the
10 area.

11 When the road was put in to facilitate
12 the logging of one block or, you know, several blocks
13 and when you want to come back in and do the others
14 that road is not quite adequate. So now you have
15 another road to build, whereas if you had planned the
16 area out entirely or to your best knowledge and
17 capability, there is always going to be some adaption,
18 you don't box yourself in.

19 You know, if there is an area that you
20 want to try to harvest and -- you know, we have gone
21 back retrogressive and looked at it and it is like, why
22 do they put the block boundary there. They could have
23 changed the layout of this block and we could have laid
24 the block properly.

25 Now we have a piece of an area to be

1 harvested that is not really accessible. We have to
2 look at some type of modification. It is this idea of
3 trying to address the -- cannot put yourself or box
4 yourself in a corner and make it more difficult for the
5 logger to achieve -- you know, to get his wood.

6 Q. Dr. Carr, on the next page -- well,
7 on the same page, sorry, page 25, in response to
8 question 44 you state in the second paragraph of your
9 response:

10 "For roads, a range of rehabilitation or
11 road retirement options are available
12 depending on the future use of the road
13 system. These options include short
14 term deactivation or maintenance free
15 drainage is provided through full
16 rehabilitation."

17 Can I ask you what you mean by
18 maintenance free drainage?

19 A. The philosophy of maintenance free
20 drainage, that was what we could come up with, the best
21 word to try and address some of the -- it's a similar
22 concept of putting a road to bed, road retirement.

23 That was viewed to be a disagreeable term
24 by many people because they thought: Well, we will
25 come back and use the road and retirement is not right,

1 but by maintenance free, is that for the period that
2 you are not going to be actively using the road the
3 road must effectively be a fairly self-maintaining
4 state that you are not -- you don't have a lot of
5 culverts that can be blocke andd plugged.

6 It is these little problems when you have
7 plugged, blocked culverts, bridges build up and blow
8 out, they cause very -- they happen in an episodic
9 manner. They will happen during the one big rainfall,
10 but these are the type of events that we found
11 consistently causes the greatest problem in our -- when
12 I go out and look at a rehabilitation plan and
13 developing them, if they had pulled these five
14 culverts, put in four waterbars there was no reason for
15 an aggravated erosion problem to occur.

16 The steps that we put forth, the second
17 half of that guideline, of the field guide really is a
18 series of planning options as many of the guidelines
19 are in Ontario, but we put forth a very specific set of
20 ideas based on the sort of -- if you are only going to
21 be away for a year and you are stopping logging now,
22 you are coming back next year, this road is the -- you
23 know, we want to use this road again, then you take
24 that into consideration and you allow for -- you put in
25 waterbars, you can back up your culverts. You don't

1 have to pull them at that time because you've allowed
2 for an emergency overflow or spill.

3 If you are looking at: Well, we are not
4 coming back in here for five or six years, you take it
5 on a little farther because you're not going to be out
6 there to maintain the culverts. I don't mean you
7 personally, but having seen fellows out there they
8 don't do it. I guess it's from my own perspective of
9 going in and fixing up the messes afterwards. For an
10 hour of your time to pull that culvert you would not be
11 spending, you know, \$25,000 to put this stream back in
12 order.

13 So we try to be very pointed about it and
14 give them a range of options at least to consider. If
15 you're not going to be back in there until the next
16 rotation, if you are finished in the watershed, then
17 make sure that thing is stable because you're not going
18 to have access to get back in there and take out your
19 bridges, decompact the road, make sure -- you know,
20 that's all maintenance free.

21 MADAM CHAIR: Does the public of British
22 Columbia like the Ministry of Forests closing down
23 roads?

24 THE WITNESS: Well, it would depend on
25 your definition of public. It can be very broad. Some

1 people do, some don't.

2 MADAM CHAIR: That's not an issue we have
3 to discuss in this evidence.

4 Mr. O'Leary, are you ready for the
5 morning break?

6 MR. O'LEARY: I could. I just have one
7 question that flows from that last question.

8 Q. Dr. Carr, are you referring to
9 primary access roads or what roads are you referring to
10 in response to Madam Chair's question?

11 A. For us, all versions, all types of
12 roads. If there is no longer a need -- now, the main
13 line system generally will stay in tact. It's when you
14 get into your secondary and your branch, your spurs, it
15 is that type of situation that you're not going to be
16 maintaining it.

17 It would depend upon your future use.
18 You know, if there is -- you don't have to pull or
19 totally rip a road out. You can make it useable. It
20 depends on your area use. There are moves to
21 accommodate recreationists. The forest road network in
22 British Columbia happens to be the key to getting many
23 people out into wilderness areas.

24 So where recreation is a high value they
25 will make sure that the main line is maintained, but

1 let's stop a lot of the -- if you want to see
2 wilderness, in my personal view, I think you should
3 walk a little bit particularly if you are looking at,
4 by leaving it there you are leaving a -- your
5 acceptance. Somebody is accepting a risk.

6 If that plugs and blows out you are going
7 to have 20 or 50 or 100 cubic metres worth of mud going
8 into your stream and somebody has got to clean it.

9 So we sort of leave that decision to the
10 people who make these risk assessments.

11 MR. O'LEARY: Now is an appropriate time,
12 Madam Chair.

13 MADAM CHAIR: All right. We will be back
14 in 20 minutes.

15 ---Recess at 10:47 a.m.

16 ---On resuming at 11:10 a.m.

17 MADAM CHAIR: Please be seated.

18 Mr. O'Leary, to give you some assistance
19 on this last part of your examination-in-chief of this
20 evidence, Mr. Martel and I have reviewed very
21 thoroughly the terms and conditions to which Dr. Carr
22 will be addressing the Coalition's terms and conditions
23 and we don't see any need to spend a long time on any
24 of those individual items.

25 MR. O'LEARY: All right.

1 MADAM CHAIR: So that might speed up the
2 latter part of this examination-in-chief.

3 MR. O'LEARY: Madam Chair, I should draw
4 to your attention that in addition to the amendment
5 that is going to be made to the Coalition's terms and
6 conditions which I referred to last week - you will
7 recall that Mr. Cassidy prompted my discussion of the
8 subject at that time in relation to the bump-up
9 provision - there will also be primarily as a result of
10 Dr. Carr's involvement in this evidence some amendments
11 to those terms and conditions to which he is
12 responsible of speaking to.

13 To the extent that Dr. Carr is able to, I
14 would ask leave to at least be able to inquire with him
15 as to his thoughts as to why the amendments are
16 necessary and what his views are as to the terms and
17 conditions. To that extent, with your permission, I
18 would ask to proceed to ask questions in respect of
19 those.

20 MADAM CHAIR: That's fine, Mr. O'Leary.

21 MR. O'LEARY: Thank you.

22 Q. Dr. Carr, I am told that during the
23 evidence of the FFT Panel No. 3 a suggestion was made
24 by the witness that was giving evidence at the time
25 that soil compaction could be mitigated by doubling the

1 normal stocking.

2 Do you have opinion to offer on this as a
3 reasonable rehabilitation strategy for the sites,
4 particularly those experiencing soil compaction?

5 A. Yes, I do have an opinion on that.
6 That has been an issues that has been raised in British
7 Columbia for quite some time.

8 You have to define the type of forest
9 product that you want to derive from the site and if
10 you're looking at a certain type of wood quality,
11 whether a saw log or a certain pulp quality, then you
12 have to be able to achieve that.

13 Just doubling the number of trees
14 doesn't -- you know, within an area you are expecting a
15 30 or 40 per cent volume loss due to soil compaction
16 which on a localized area may be possible, just
17 doubling it, what you wind up with in the long run is a
18 lot of little trees that really don't have the value.
19 This increase in stocking standards doesn't, I think in
20 my mind, effectively deal with the issue of what are
21 you trying to supply.

22 Q. Thank you. Can I now ask you to turn
23 to address the issue of site preparation. My question
24 is does site preparation have the potential for site
25 degradation?

1 A. Yes, it does.

2 Q. All right. And can you tell me, is
3 there a field guide that has been created which deals
4 with site preparation and the management of site
5 degradation?

6 A. Yes, there is. In British Columbia
7 the field guide -- I believe it is behind Tab 8. In
8 British Columbia we have tried to bring in mechanical
9 site preparation within the same bounds of timber
10 harvesting with regards to site degradation. You have
11 the option and the capability out there to cause severe
12 site disturbance because you do have Cat skidders, you
13 do have heavy equipment going across the block.

14 There are obviously objectives in the
15 scarification or the mechanical site preparation. The
16 idea of tying it into the sensitivity is that if you
17 are on a compacted sensitive site and you are out there
18 running around with a D7 or D8 your compaction -- you
19 are compacting the site just as if you were on timber
20 harvesting.

21 So it has the potential, its not always
22 there, but as with even timber harvesting we have found
23 that there are blocks and there are times when instead
24 of really mechanically site preparing a site you can
25 incur a great deal of site degradation and you have not

1 achieved the objective.

2 With regards to site preparation, we have
3 tried to bring in the same framework of sensitivity.
4 By identifying the sensitivity of the site, then you
5 can start prescribing the proper equipment and the
6 proper treatment to achieve your management objectives
7 and not incur any form of degradation.

8 Q. Dr. Carr, I would ask you now to
9 briefly indicate to us how this field guide operates,
10 and with that question in mind I would also ask you to,
11 where possible, indicate if there is any similarity
12 with the field guide that you took us through
13 extensively yesterday, which is Under tab 7 of the
14 witness statement.

15 I simply ask you to do that for reasons
16 of brevity. So if there is a similarity and we can
17 avoid a further lengthy discussion, please in the
18 interest of brevity do so, but if you can indicate to
19 us how this field guide under Tab 8 works in respect of
20 site preparation maintenance, would you please proceed.

21 A. They're very similar in the way that
22 they work in that you determine the site sensitivity
23 looking at various processes that could potentially
24 degrade the site.

25 Actually, the erosion, compaction and I

1 believe soil displacement components are virtually
2 identical to what we would do in timber harvesting. We
3 are using pretty the same sensitivity because it is the
4 impact of blading or compaction.

5 They have added a separate -- newer
6 indices looking at sensitivity and I believe
7 sensitivity to forest floor displacement; depth of your
8 forest floor, how much area you want to move, do you
9 move -- if you have a thin forest floor or a thick
10 forest floor it ties into the actual equipment
11 operation. That's the only addition to the same
12 framework of sensitivity.

13 Q. All right. Can you tell me, Dr.
14 Carr, are regulated limits being considered for site
15 degradation due to site preparation in British
16 Columbia?

17 A. Yes, they are.

18 Q. Can you tell us a little more about
19 that?

20 A. They are being brought in under the
21 same terms of reference to the maximum levels of
22 allowable site degradation, looking at deep rutting,
23 compacted area, excessive gouging, those sorts of
24 issues.

25 As it stands, the draft limits are -- the

1 program has been -- is in draft stage and will be put
2 out in an interim form. The last estimate was some
3 time in May. So they can begin looking at how
4 effective the system is and begin the field checking,
5 but they will not allow anymore excessive compaction or
6 rutting on the site because of mechanical site prep.

7 That maximum is going to stay the same.
8 It's not like, we can go out and log and we can do 19
9 per cent of the area, heavily bladed, compacted, rutted
10 areas and then you come out and mechanical site prep
11 and add to that. In that definition, 19-19, nine of
12 four, will pertain to all operations on the land base.
13 As I say, it is in draft form, but it is coming out
14 this year. It will an adjunct then to the disturbance
15 caused by harvesting.

16 Q. Dr. Carr, can I ask you --

17 MADAM CHAIR: Excuse me, just a question,
18 Dr. Carr.

19 MR. O'LEARY: Sorry.

20 MADAM CHAIR: With respect to the
21 techniques of scarification, in Ontario we use
22 windrowing as well. Is it a little trickier trying to
23 decide what is a rut or a site disturbance with that
24 kind of operation as opposed to timber harvesting where
25 you see skids trails and you -- in other words, is it

1 tricky to say this is scarification, but this is site
2 damage?

3 THE WITNESS: The way that we have
4 approached it, and I haven't seen the final about
5 mechanical site prep is going to tie in completely, the
6 site disturbance limits and the survey method that is
7 used to determine how much area are in these, a very
8 standard form of definition is being applied.

9 So that if -- to give you an example.
10 One of the things that it talks about is the
11 monitoring. If you can -- a heavily impacted skid
12 trail by definition is a skid trail where you can see
13 the tire imprint, the tract and it is greater than
14 two -- I mean five centimetres or two inches into the
15 mineral soil. That's the definition that we have and
16 that is a potentially degrading level of compaction.

17 MADAM CHAIR: Let me get this straight.
18 A rut that is two inches deep?

19 THE WITNESS: Yes.

20 MADAM CHAIR: Anything beyond that is
21 unacceptable?

22 THE WITNESS: Yes. Well, you are allowed
23 a certain percentage in that category.

24 MADAM CHAIR: But that's the maximum.

25 THE WITNESS: Once you've hit that the --

1 the work that we have done shows that when you have
2 that level, they have gone back and looked at measuring
3 compaction, measuring soil density and at that point
4 you have an unacceptable increase in soil density.

5 They are doing more work I can say on --
6 it may go to 10 centimetres, but right nows it is set
7 at five. They are testing that.

8 As far as how it applies to mechanical
9 site prep, in the monitoring we just determine -- we
10 don't care how the disturbance got there. If it is an
11 excessive disturbance, then it counts.

12 Now, as I say, the definition of
13 mechanical site prep, I have not seen the final
14 version. They are going to accommodate the needs of
15 for mechanical site prep to give you a specific level
16 of disturbance, but they are defining this is the type
17 of disturbance that we want. Anything beyond that we
18 feel is -- you are counteracting what your gains are.

19 So that's very new. It will be field
20 tested this year, but it will come in to the same
21 thing. The ultimate is they -- it comes down to that
22 they have set this 19 per cent on low and moderate
23 sensitivity sites as the maximum amount of area that
24 can potentially be degraded. That's the acceptable
25 level you know you are going to have operations, but

1 they do not want you going any further than that.

2 MADAM CHAIR: Mr. Martel and I, we have
3 seen a lot of sites that have been scarified, for
4 example, and I guess we have seen a lot of sites that
5 have furrows deeper than two inches. I guess we are
6 just a bit startled by that.

7 THE WITNESS: As I say, the initial
8 definition of the five centimeters was for timber
9 harvesting. I do know that they are going to modify
10 that with mechanical site prep.

11 So that, you know, much of mechanical
12 site prep you are trying to achieve a furrow of a
13 specific depth, but you're not trying to achieve a
14 compacted furrow and that's the difference.

15 In a five centimetre rut or impression
16 where you can see tire tracks, you know of the -- there
17 you have compaction. It's like why if you are
18 compacting the site what are you achieving for
19 mechanical site prep.

20 Now, you can have furrows such as some of
21 the disentrenchment equipment where you have 12, you
22 know, 30 centimetre furrows, but those are loose and
23 fluffed up that are created.

24 It will be interesting to see how they
25 come up with a final definition. It's just that it

1 will be incorporated into the allowable limits. It
2 will be regulated. Most site preparation is -- really
3 it doesn't give you such degradation, but there are
4 instances where it can. It's the same with timber
5 harvesting, is it to give a strong emphasis to: Let's
6 stop that. Even if it is 5 or 10 per cent of all the
7 areas you do, there is no reason that you should be
8 causing more problems.

9 MR. MARTEL: Can I back up for a minute.
10 I think you said that for harvesting practices the
11 amount of the -- the level is two inches.

12 THE WITNESS: Five centimetres --

13 MR. MARTEL: Five centimetres or two
14 inches.

15 DR. CARR: A two-inch obvious impression
16 into the mineral soil. Not to the forest floor, but
17 into the mineral soil.

18 MR. MARTEL: Okay, fine. Pardon me.

19 MADAM CHAIR: Go ahead, Mr. O'Leary.

20 MR. O'LEARY: Thank you, Madam Chair.

21 Q. Dr. Carr, can you tell me, do they
22 have silvicultural guides in effect in British Columbia
23 that relate to site preparation?

24 A. Yes, they do.

25 Q. All right. If they have those, can

1 you tell us why it has become necessary to develop the
2 guide which you have included under Tab 8 of Exhibit
3 2041?

4 A. That's not the guide that I developed
5 for B.C.

6 Q. I apologize. It's one of the few
7 that you didn't.

8 A. That incorporated our ideas. I did
9 not develop that or I really wasn't a part of it.

10 The guide is like our other one, is to
11 assist in timber harvest planning, that by identifying
12 the sensitivity of the site you can make a better
13 prescription so that the equipment and the system that
14 you use achieves your given objectives without causing
15 any unnecessary disturbance.

16 One of the things that we found in
17 looking at mechanical site prep early on is that the
18 practice of windrowing, say, when carried out rather
19 aggressively can result in a fair bit of compaction and
20 some very deep gouging and extensive removal of the
21 forest floor and, thus, some form of degradation.

22 As I say, it's only when it's -- we have
23 seen it come out when it's done aggressively. So let's
24 try to stop that, think about what we are doing, not
25 putting equipment on compacted -- you know, on your

1 Clay Belt and that's really in your own -- you know, in
2 your guidelines as well that, you know, you want to
3 keep your traffic down on your compaction sensitive
4 sites.

5 MR. MARTEL: Where do you consider the
6 loss when you are windrowing of the available for
7 rehabilitation? Does that come into the --

8 THE WITNESS: In rehabilitation? You
9 mean in reforestation?

10 MR. MARTEL: Yes. I mean, where do you
11 put the windrowing? Where do you categorize it in
12 terms of site degradation and so on?

13 THE WITNESS: It's only categorized if
14 the -- in conjunction with doing it, that your prime
15 mover of your equipment is compacting other sites as
16 you are backing up and moving in and you start building
17 compaction across the area. Some sites are very
18 sensitive to even one or two passes of a piece of
19 equipment and that's where it's at.

20 MR. MARTEL: I guess I am not explaining
21 myself carefully, though.

22 When you windrow for a long time, that
23 strip is going to be out of production; you are not
24 going to have trees grow in an area that was winrowed
25 next year or the year after. It is there for a long,

1 long time before it decays and comes back in how many
2 years. God knows how long it's going to take.

3 I just wonder where you categorize it in
4 terms of the loss of the amount of -- in your
5 calculations, let's say, a sensitive a very, very
6 sensitive site, four per cent, you are still only
7 looking at where the compaction occurs.

8 Do you ignore that site, that part of the
9 site which is lost because of windrowing?

10 THE WITNESS: I'm not sure how they are
11 going to address that. The four per cent or whatever
12 level deals specifically with the soil compaction
13 component. I believe they're going to look at an areal
14 extent. Like, how broad an expanse are you scalping
15 away. There has been talk of looking at that, but I
16 honestly cannot give you any further on that.

17 MR. O'LEARY: Q. Dr. Carr, I would like
18 now to turn you to the issue of the detection and
19 monitoring of soil disturbance.

20 At page 11 of your witness statement,
21 question 17, you are asked whether -- the question is:

22 "Can you reasonably accurately assess
23 site damage using the visual survey
24 method for water sometimes referred to
25 as..." what is effectively known as

1 windshield surveys.

2 I was wondering whether or not you have
3 any further comments or any experiences that you would
4 like to highlight for us today?

5 A. I don't think if you want to have a
6 reasonably accurate estimate that you can use a
7 windshield or just a cursory visual survey without
8 having some extensive walking of the block.

9 Many of the -- much of compaction can be
10 very subtle. It's not like a big gouge out there.
11 There are ruts and you may not even be able to see them
12 through the slash. So without walking, at least as a
13 minimum walking across the area and looking
14 specifically for the types of disturbance that are,
15 detrimental, potentially detrimental, I just don't see
16 how you can see it.

17 The other side of that is that it depends
18 without a definition of what is potentially detrimental
19 disturbance. Everybody has a different perspective and
20 I have been involved in going out to do surveys and as
21 soon as I -- I remember looking at a block on a hill
22 and going: How in the world could they have left them
23 do this. I started to go off the deep end and when we
24 went out and did the survey it turned out that it was
25 just more of the visual because there was a light

1 textured soil and you can see a lot of it, but the
2 actual disturbance from a detrimental standpoint wasn't
3 there. So now you are looking at, it is all in the eye
4 of the beholder.

5 I have seen and I have been at meetings
6 with foresters that looked at areas where 35 per cent
7 of the area had been bladed, skid road construction,
8 constructed skid roads on a slope and they go: It
9 looks fine to me.

10 So it is coming back to definitions and
11 standards to try to take out the personal bias and get
12 away from some subjective arguing.

13 Q. Dr. Carr, you have included a field
14 guide under Tab 6 of Exhibit 2041 entitled Measuring
15 Soil Disturbance Following Timber Harvesting.

16 Can you tell us the purpose of this field
17 guide?

18 A. The purpose of the field guide behind
19 Tab 6 is this is -- it's another one, a companion
20 document. It establishes a very specific surveying
21 method, specific definitions so that if there is a
22 question sometimes you can look -- you know, some
23 people say: I think that's bad, I think that's good.
24 You get that out of the way.

25 You have a method to determine how much

1 area is in skid road landing, skid trail, whatever type
2 of disturbance you want to measure. So it's a very
3 systematic system. It is one that is repeatable, there
4 is a statistical validity behind it and if I did a
5 survey you could go out and follow the same procedures
6 and within a reasonable level of confidence interval
7 come up with the same answer.

8 Q. When would one apply field guides,
9 this field guide which is under Tab 6? When would you
10 use it?

11 A. The field guide, and this one is
12 specifically directed at timber harvesting, is used as
13 part of the post-harvesting audit or assessment
14 procedure.

15 In British Columbia, after a block is
16 harvested someone has to come in and sign off, they
17 call it, that the block was logged according to the
18 plan, it was done in an environmentally -- you know,
19 with a conscience to try to minimize impacts. They
20 followed what was done.

21 If for a reason it does not appear that
22 the plan was followed properly or it said summer
23 logging -- winter logging and somebody went in in the
24 summer where it said: No, there is not to be any --
25 when the ground got wet get off of it but they kept

1 operating, then this is when this manual comes in to
2 get away from somebody going: Well, I thought we did a
3 good job and somebody else going: No, I think you did
4 a terrible job. It's like, let's sit down, let's do
5 the survey and come up with a yes or no answer.

6 Q. Now, if - I don't have a specific
7 example, hypothetically - testing was done after the
8 harvest had been completed and it was found that some
9 group was in violation, can you tell me, are there any
10 enforcement standards in British Columbia that apply?

11 A. Yes, there are. That is when those
12 maximum standards come in. That's your target figure,
13 maximum allowable. This gives you where you are not
14 and then you would go into either rehabilitation or
15 some other form of penalty procedure.

16 Q. Is the information that's gathered as
17 a result of applying the guide included under Tab 6 of
18 any assistance in enforcing the various levels, the 19,
19 9 and 4 levels you referred to?

20 A. Yes, it is. This is the measurement
21 system for determining compliance with the standards.

22 Q. All right. And if these tests
23 indicate -- can you tell me, is there any connection or
24 relationship between the results of these tests and the
25 annual allowable cut?

1 A. I will deal with that in two parts,
2 if I may. The first part is that if they include some
3 type of an annual allowable cut reduction in the
4 penalty mechanism which will be coming out I believe
5 shortly, this would be the determining factor of how
6 much reduction you're looking at.

7 Compliance to the guidelines or the
8 standard or any other form of penalty, that's where it
9 is at, one of the things or activity that's currently
10 being undertaken is that using the information over the
11 past three or four years that have been gathered using
12 a standard survey, they are now going back into timber
13 supply analysis, long-run sustained yield projection
14 and building in more appropriate figures than may have
15 been assumed before with regards to the amount of area
16 potentially degraded.

17 So there is a tie-in both with a penalty
18 and there is a tie-in also in the long-run established
19 yield projection.

20 Q. I ask you, Dr. Carr, why it has
21 become necessary to develop this field guide in British
22 Columbia?

23 A. It was necessary for several
24 different reasons. The first being that when we --
25 from a research standpoint, when you begin looking at

1 the vast array of literature throughout the world on
2 how much area is in landing, you know, how much area is
3 potentially disturbed, and I'm sure that you have seen
4 that there are a number of different documents and they
5 state: We had 9 per cent, somebody else has 15 and
6 someone had 25.

7 When you look at it closely these are
8 almost often non-comparable because of completely
9 different surveying techniques and methods you're
10 assessing. In one study you may just be walking along
11 all the road and assuming a width, some may run linear
12 methods; there are a variety of systems.

13 So it is important to establish a
14 procedure that when we do surveys we can all talk about
15 and we know what we are getting at.

16 Then the next level is then within the
17 terms of a regulation or a standard that you have
18 something that is statistically valid, is repeatable
19 and should it come to it would be able to be held up in
20 the long-run in a court challenge.

21 Q. Dr. Carr, I would ask if you could
22 briefly take us through this field guide and explain to
23 us how it works and the most important provisions as
24 you see it.

25 Madam Chair, Dr. Carr has asked with

1 leave of the Board whether or not he can use a flip
2 chart to assist in the explanation here.

3 MADAM CHAIR: What are we starting to do,
4 Mr. O'Leary?

5 MR. O'LEARY: He is going to review the
6 field guide as contained under Tab 6 of Exhibit 2041.

7 THE WITNESS: All I will do is give you
8 just the fundamental principles of the survey.

9 The survey manuals are generally very
10 detailed and I know that author of this one quite well
11 and even I have trouble with his writing style and
12 reading it, believe me. We have gotten into
13 discussions about this issue.

14 MADAM CHAIR: All right. If you want to
15 spend just a few minutes, Dr. Carr, on highlighting how
16 this disturbance is measured.

17 THE WITNESS: Just a flavour of how you
18 do this. It is a combination system. There are two
19 types of measurements made.

20 Now, we already have defined what you are
21 measuring. Either you are looking at the area and
22 landing, the area in bladed skid road and the area in
23 heavily impacted skid trail, and heavily impacted skid
24 trail is that five centimeter impression. The
25 definitions are in the back.

1 What you have here is your cut block,
2 very simple. They would establish a randomly oriented
3 grid of even spacing so that you cover the block
4 effectively. For a compliance level survey you have to
5 have 35 sampling points throughout the block.

6 When you are out there you go to this
7 point, you take a random -- a preassigned random
8 orientation. Statisticians love randomness to make
9 life nice. You would say, you are north 37 east, on
10 that bearing you run a 30-metre transect. They tape
11 out 30 metres and then as you are working your way back
12 to your plot centre every two metres you determine the
13 soil class at a point directly below the tape. It is a
14 point estimate. So you walk along.

15 This is pretty simple. These are your
16 points, big scale. You have -- I would like to do it
17 in brown and green, but...

18 There is your -- that's your 30 metre
19 line and as you are going along the tape, hopefully you
20 have somebody holding it or it is tied to a stake. I
21 like to have two people doing the survey. I hate tying
22 it to a stake and then it falls down.

23 So every two metres. So you would have
24 15 points along this line, you would go this is an
25 undisturbed spot, look down again, I have got a rid

1 road and a skid road is defined by -- if this is your
2 skid road, any point fall within the cut or the fill is
3 included. If you are going along and your points are
4 here, that's an undisturb point. You would get here
5 and you would go: Skid road, cut back, skid road,
6 running surface and then you would say undisturbed.

7 These two points would be considered by
8 definition potentially degraded sites. At the end you
9 have, say, three of your 15 points come out in one of
10 the categories. So for that particular line 25 per
11 cent of this particular transect would be in
12 potentially degraded sites.

13 You would have a total survey of -- at a
14 minimum 35. So you may have the opportunity to have
15 all of them on a skid road. I have done lines where
16 you have a hundred per cent, all 15, but more than not
17 if an operation is done right you have a lot of zeros.
18 You then take the averagage and put on a statistical
19 confidence level.

20 It's very easy to do in the field and we
21 teach it as part of the workshop. It now takes about
22 two hours of field training and people have the
23 fundamentals down quite quickly. So you don't have to
24 do a lot of -- you don't have to measure bulk density.
25 You don't have to measure any parameter by definition

1 and these definitions are based on all the research
2 that show that the categories are potentially...
3 ---Fire alarm goes off

4 THE WITNESS: To sort of carry on. We
5 have the 35 line and you can establish a confidence
6 level with that. Often what we have found is that it
7 says that if you come up with an average for the site
8 of 25 -- let me say to put it in compliance 16 per
9 cent, then we figure our confidence interval is at a 90
10 per cent level. You are looking generally 16 per cent
11 plus or minus two or three per cent. You know, that is
12 how you deal with what is called a grid point intercept
13 system.

14 MADAM CHAIR: Who does this measurement?

15 THE WITNESS: At the current time it is
16 done by a contract consultant, silvicultural
17 consultant. We have a lot of them.

18 MADAM CHAIR: For the Ministry of Forests
19 or the operator?

20 THE WITNESS: It depends on who wants to
21 do the survey. I mean, the companies use the survey
22 internally and they will often do it with their own
23 staff.

24 Should you come to the point where this
25 block is being addressed from a compliance level, if

1 the Ministry of Forestss says: We think you are out of
2 compliance, we want a survey, then a contract will be
3 let to an independent who has gone through the course,
4 effectively certified -- there is not a true
5 certification, but they are even talking about that
6 from a regulation standpoint. They will do the survey
7 and come back with: This block was in or out of
8 compliance and it was by this order of magnitude.

9 In regards to the cost, if the system --
10 the difference between this and some of the systems
11 used in the U.S. where they are trying to measure --
12 determine soil density and whether this degradation
13 where you've measured specific soil parameters -- you
14 can spend a lot of money doing bulk density analysis,
15 believe me. With the assumptions of these classes you
16 can walk along.

17 This survey was designed to be done by
18 two men in the field on a 15- to 75-hectare cut block
19 in half a day and give you an answer. So you are
20 looking at, should this block be called up. You may be
21 looking, by the time you are finished, a \$500 survey
22 fee.

23 There is a little bit of game playing
24 going on on who pays for it and it appears it is going
25 to go to the loser. So there is the responsibility

1 that if a member of the Forest Service says: I think
2 that block is bad, go survey it and the contractor goes
3 and it comes in within compliance, the Ministry of
4 Forests has to pay for the survey. If it is out of
5 compliance, then obviously the need the survey was
6 there and the company will pay for it. This is the
7 general framework that they are looking at.

8 MR. FREIDIN: Sorry. The general
9 framework you are looking at?

10 THE WITNESS: That's the general
11 framework with regards to the costs and who pays for
12 the compliance survey.

13 MR. FREIDIN: Thank you.

14 THE WITNESS: Very quick, very fast way
15 through, but you can spend time reading the manual. It
16 just gives you an idea that it is a statistically valid
17 system and it has been tested very rigorously. We have
18 compared it to -- used on blocks. We have used several
19 different methods and this has come out to be
20 consistently the one that's the best for us, gives us
21 the answer we want, it's cost effective. You're not
22 spending a lot of time and money doing it and there's a
23 lot of validity there.

24 MR. O'LEARY: Thank you, Dr. Carr.

25 Q. You don't need to turn to it, but you

1 so mention in your witness statement that a survey of
2 site degradation throughout the interior regions of
3 British Columbia is underway and just for the record
4 you indicate that in response to question 13, page 9.

5 Can you tell me, has that survey been
6 completed?

7 A. The surveys are part of an ongoing
8 monitoring program. I had hoped to have with me their
9 compiling of the first three years' results and when I
10 wrote that they had promise me it by mid January, which
11 obviously did not happen.

12 What I have included as part of Tab 9 are
13 the 88/89 results as the -- interim results as the
14 system was progressing. So we do have at least a
15 fairly good idea of what is occurring out there just by
16 looking at the 88/89 summary which looks at all the
17 surveys to date at that time over the various forest
18 regions and the various ground conditions.

19 Q. Again, can I ask, in relation to the
20 results that are set out in the document contained
21 under Tab 9 of Exhibit 2014, in your opinion is there
22 any similarity between the terrain that was surveyed
23 and the results are indicated in that report and the
24 terrain in northern Ontario?

25 A. I have not been in the terrain of

1 northern Ontario, but from what I've read and the
2 descriptions you could go -- there is a page where they
3 break it down by site class -- I mean, by slope class.

4 If you wanted to look at it you can then
5 pull out the data that's appropriate for -- if you are
6 only dealing with logging on less than 30 per cent
7 slopes, that data -- I'm pretty sure is broken out
8 here. I know it will be broken out in the final one.

9 So it would define the system in the
10 bigger document for summer ground logging, slopes less
11 than 30 per cent even to the point of what type of soil
12 that would be possible to extract.

13 If you wanted to look at it specifically
14 with regards to similar ecosystems, the Prince George
15 forest region would probably be -- is also one of the
16 areas that is most heavily surveyed. It would probably
17 be an even better one to focus on.

18 There is a great deal of information here
19 on -- it's preliminary. I will forward it to Coalition
20 and they can pass it on to you, the final report, as
21 soon as it is available.

22 Q. Thank you, Dr. Carr. Have you formed
23 an opinion as to whether or not these surveys and the
24 results have any relevance to the situation in Ontario?

25 A. I think we would be able to pull out

1 of it some very strong relevance in looking at specific
2 terrain types and logging systems. I know that the
3 larger database will break them down into systems and
4 terrains types. There should be at least a reasonable
5 level of comparability.

6 Q. All right. Now, turning to question
7 15 at page 10 of your witness statement, you state
8 that -- in the very last sentence you say:

9 "As a result, many foresters over the
10 years have overlooked its importance as
11 a significant factor for future forest
12 productivity."

13 You were speaking specifically with
14 respect to site degradation. Can you tell me what your
15 experience is as to whether or not this comment you
16 have made still applies in British Columbia?

17 A. I don't think it applies in British
18 Columbia any longer, although there may be some that
19 don't, but it's very difficult now to operate from a
20 forester's standpoint in British Columbia and not face
21 at least dealing and recognizing site degradation
22 primarily through the regulations -- the standards that
23 are enforced.

24 Q. Can you tell me, Dr. Carr, has site
25 degradation been recognized in other parts of the

1 country other than British Columbia?

2 A. Yes, it has. There have been studies
3 in Newfoundland, Labrador area. Some of the research
4 that's been put forth to you on ground base logging
5 systems and level of disturbance from a -- I was
6 recently at a workshop in Alberta where they are
7 discussing the same issue. We presented to them at
8 that time the system that's in place in British
9 Columbia and they are now looking at whether or not it
10 is adaptable or can be fit to Alberta.

11 There is also some research that -- in
12 talking to one of the people at the conference with
13 Forestry Canada out of Edmonton, they are going to take
14 a look at from a -- some of the trees physiologists and
15 growth people were finding they were not getting the
16 type of regeneration and type of growth that they want
17 or expect from some of their aspen regeneration
18 stands -- or aspen stands of regeneration and in
19 looking at deciduous tree management and they think
20 that compaction might be the issue and they are
21 beginning as to well to look at it for that type of a
22 forest system.

23 Q. All right.

24 MR. O'LEARY: Madam Chair, I have got
25 just one minute after two twelve. I have about three

1 or four more questions and then I will be moving on.

2 MADAM CHAIR: I think you have got about
3 four minutes, Mr. O'Leary.

4 MR. O'LEARY: We will have to fix this.

5 Q. Dr. Carr, you indicate in your
6 response to question 19 on page 12 that research has
7 indicated that the impacts of site degradation may not
8 be quantifiable until ten years or more.

9 Can you describe the research you are
10 referring to and the nature of the effects that were
11 reported?

12 A. The specific research that I was
13 referring to is some that I conducted and is published
14 by the B.C. Ministry of Forests as FRDA, Report, BCF
15 RDA Report 03.

16 MR. FREIDIN: Which number?

17 THE WITNESS: 03.

18 MR. FREIDIN: Thank you.

19 THE WITNESS: Where we are looking at
20 differences of height growth on landings and
21 non-landing, non-disturbed areas at five years and then
22 subsequently 11 years.

23 At the five-year level, although there
24 was a statistically valid difference of about two or
25 three centimeters, if you measure enough trees you can

1 find the difference, I suppose -- well, I don't
2 suppose, we did find a difference, but you could not
3 walk out and just visually do a very quick survey.

4 You look at the site and go: That is
5 fully restocked, the tree is growing as well as the
6 tree out in the cut block.

7 When we looked at the adjacent stand and
8 did the same type of assessment, but it had been logged
9 or stand -- it had been logged 11 years previous, this
10 difference in height growth was becoming far more
11 pronounced. It was no longer something that you just
12 see I believe -- I have the paper here and I can get
13 it, but at that time we were looking at a 45 per cent
14 difference of height growth of the on-landing versus
15 the off-landing trees.

16 The second piece of research is one that
17 is a joint effort between Dr. Jim Arnott from Forestry
18 Canada, myself and one of his summer students. They
19 had established some long-term trials to look at
20 regenerating winter landings in British Columbia. This
21 is published in the Forestry Chronicle. It's in my
22 bibliography.

23 Now, what we found in measuring the trees
24 and determining they had some preliminary data, they
25 monitored it for five years and we came in back in and

1 measured it later, I think -- we came in at year eight.
2 They were two year old seedlings and we came in eight
3 years later, that there was a 45 per cent difference in
4 height growth associated with degradation.

5 Of that 45 per cent, by looking at soil
6 properties we attributed 15 per cent of that to soil
7 compaction and 30 per cent of that to the loss of
8 extensive nutrient capital in the process of creating
9 the landing.

10 So it appears and it comes to
11 substantiate some of our other observations that
12 earlier on you can get adequate regeneration. You can
13 get adequate -- what you would consider adequate
14 growth, but as the tree demands more and is trying to
15 expand its root capability, certain sites -- you just
16 can no longer supply the nutrient and the water demand
17 and growth can decrease.

18 I guess a point that probably goes back
19 to some of the beginning of the evidence. Site
20 degradation does not necessarily mean that you have no
21 recoverable volume that is taken totally out of
22 production. Site degradation can have a 15 per cent
23 volume reduction on a piece of ground. That is still
24 site degradation and it's the accumulation of these
25 little pieces that can be problematic.

1 Q. Thank you. Dr. Carr, is the approach
2 developed for British Columbia compatible with the
3 adaptive management approach?

4 A. Yes, it is. There are very well
5 defined goals, specific target levels that are to be
6 adhered to and that are predicted by the type of system
7 or the threshold.

8 There is a monitoring sequence which we
9 have to see how far or how close are you to achieving,
10 are you achieving these goals or not and how far over
11 or under that specific target value are you and then
12 there is this continual reiteration of: Well, if we
13 are meeting the guidelines or standards, fine, and
14 that's liveable or the standards are maybe too high,
15 then they will be lowered.

16 So it is an adaptive process. I honestly
17 think that had we found by our survey method that
18 nobody could come into compliance the levels would have
19 been moved up because there was no way that you can --
20 they wanted the levels to match what could be expected
21 from good timber harvesting practices.

22 So there is, you know, this reiterative
23 approach and there is continual refinement going on
24 right now and more and more research to try to get a
25 better handle on the predictive component with regards

1 to volume loss for -- if you are compacting the soil,
2 how much tree loss -- how much volume can you expect to
3 lose when you come back in to harvest it and long-term
4 studies are being established, several are in place and
5 the research branch in British Columbia is developing a
6 cooperative effort with work in the U.S. on dealing
7 with specific issue of the long-term predictive
8 capability.

9 Q. Thank you.

10 MR. O'LEARY: Madam Chair, this would be
11 an appropriate time to break for lunch.

12 MADAM CHAIR: Thanks, Mr. O'Leary.

13 Will you be finished after lunch?

14 MR. O'LEARY: I will be finished
15 hopefully before the afternoon break.

16 MADAM CHAIR: So about an hour left?

17 MR. O'LEARY: I would guesstimate that.

18 MADAM CHAIR: Ms. Seaborn, how long will
19 you be.

20 MS. SEABORN: At this point, Madam Chair,
21 I don't have any questions for this witness. I want to
22 wait and hear the evidence on the terms and conditions
23 and make sure I am clear on the Coalition's position.

24 MADAM CHAIR: Okay. You will be starting
25 this afternoon then, Mr. Freidin, in your

1 cross-examination.

2 MR. FREIDIN: Good.

3 MADAM CHAIR: We will be back at 1:30.

4 ---Luncheon recess at 12:05 p.m.

5 ---On resuming at 1:30 p.m.

6 MADAM CHAIR: Please be seated.

7 MR. O'LEARY: Madam Chair.

8 Q. Dr. Carr, could you please turn to
9 question 32, page 19 of your witness statement. In
10 that you make reference to cumulative effects
11 modelling.

12 I wonder if you could explain to the
13 Board from a physical process point of view what
14 constitutes cumulative effects modelling?

15 A. In regards to the physical processes
16 with cumulative effects modelling, a series of steps
17 are undertaken to try to frame all the impacts or as
18 many as you can that could occur on a system when you
19 undertake some type of operation such as timber
20 harvesting.

21 You would look at, say, the prediction of
22 the amount of area exposed by the operation, whether it
23 is blading, road building, whatever, determine some
24 type of prediction of the quantity of sediment that
25 could be generated and transported through the system,

1 look for, as that enters system, some impact on the
2 water quality issue that you may be interested in.

3 In this process you try to define and
4 hopefully predict how much is going to be moving
5 through, then as far as cumulative effects modelling is
6 generally concerned you would make a prediction,
7 monitor the impacts, see if the impact that you have
8 predicted matches what you have realized, then if it's
9 not what you've predicted, to go back and try and
10 refine some of the relationships to give you a better
11 predicting capability.

12 Q. All right. Now, in response to
13 question 33 on the following page, you state that:

14 "Cumulative effect modelling is generally
15 applied on a watershed basis."

16 What do you mean by "applied on a
17 watershed basis"?

18 A. "Applied on a watershed basis." By
19 that I mean that there is a pass through of the impact.
20 What you do on an area within a given watershed or
21 basin can be carried through and have an impact farther
22 down in the system, not a specific on-site impact, and
23 that any given impact of a specific, sort of specific
24 location that enters the system, you can then have
25 impacts from something on another area within you're

1 operating, you disperse spacially or throughout the
2 area of operation.

3 These, you know, small bits here, small
4 bits there, they work their way into the system and be
5 combined at some point to have a very significant
6 impact when you cross a threshold level, say, for water
7 quality.

8 An example would be, you know, so much
9 sediment coming from this cut block operation, so much
10 from another, all working their way down where all
11 these streams or wherever it happens come together.

12 You now have three sets of input and if
13 you have a system that's very sensitive to sediment
14 input, you know, in particular, then you can effect a
15 change. So it's on a spacial standpoint. The other --
16 from distribution.

17 The other thing is that over time there
18 is another component that you can start altering the
19 basic characteristics within your area as you are
20 harvesting timber. The more that you take out, the
21 more that you can begin to alter some of the
22 relationships to the point where, again, you hit sort
23 of a critical level or a threshold level and then you
24 are going to start incurring impacts. So there are two
25 components both within a given area.

1 Q. Dr. Carr, do you have any personal
2 experience with the cumulative effect of timber
3 management activities on a particular watershed?

4 A. Yes, I do. I have, particularly in
5 the last three years, been dealing with the impacts of
6 timber harvesting operations in both the Greater
7 Vancouver and the Greater Victoria municipal watersheds.

8 I've also worked with the Department of
9 Fisheries and Oceans and the B.C. Forest Service
10 Research Branch in assessing post-logging after a
11 watershed has been logged, the amount of area that has
12 been disturbed, degraded, the amount of area
13 susceptible to erosion and then in prescribing how can
14 we mitigate or rehabilitate these areas.

15 Q. All right. In your experience, Dr.
16 Carr, can you tell us what types of terrain are
17 cumulative watershed effects found?

18 A. Cumulative watershed effects are
19 found across all types of terrain. In, say, the
20 coastal areas where we have steeper, more constrained
21 watersheds it's on a smaller basis, but that doesn't
22 limit it like when you have a very extensive watershed.
23 You can if you effect enough of the area you will have
24 cumulative impacts. It's a matter of scale and the
25 amount of area and the type of operations, but it's

1 just not steep mountain side watersheds such as you see
2 in the coastal British Columbia. It's a major issue in
3 B.C. and in the northern plateau areas as well.

4 Q. Do you have an opinion, Dr. Carr, as
5 to the level of concern that exists in respect of
6 cumulative watershed impact in British Columbia
7 presently?

8 A. At the present time in British
9 Columbia there is a fairly extensive concern with
10 regards to cumulative impacts. It is important and is
11 becoming at the forefront from two sides.

12 One being from the impact on the
13 fisheries resource and the problems that have been
14 attributed to timber harvesting, sediment delivery and
15 impact on fish habitat spawning areas. It is in the
16 paper quite often, everytime there is a rainstorm and
17 another landslide. It's all blamed on the logging.

18 So there is a tremendous effort in
19 looking at sediment delivery modelling by the B.C.
20 Forest Research Branch in conjunction with the
21 Department of Fisheries and Oceans to better understand
22 and be able to predict these impacts.

23 The other area where cumulative impact
24 effects is probably even superseding the fisheries
25 issue is in water supply systems for municipal

1 watersheds and community watersheds.

2 That was the primary focus with regards
3 to Vancouver and Victoria. Several other watersheds,
4 district watersheds are beginning to see what we
5 recommended with Vancouver and are asking for a similar
6 type of assessment of the impacts and we have recommend
7 for Vancouver, and it has been adopted by the Greater
8 Vancouver Water Board, that they undertake very rapidly
9 a cumulative effects modelling system approach to the
10 timber harvesting operations at the present time.

11 When we reviewed it, they had some very
12 wonderful statements about logging to improve and
13 protect water quality, but we could find no
14 decision-making process. At the public hearings that
15 we had that was the -- came out time and came again.
16 They say they are logging to protect water quality and
17 yet there is no measure. What do they base the fact
18 that we are logging and not doing any damage.

19 That issue for quite a while was hitting
20 the major newspaper on at least a monthly basis to deal
21 with logging and water quality issues.

22 MADAM CHAIR: Dr. Carr, the Board has
23 had -- lots of witnesses have referred to cumulative
24 effects and one could get the impression reading the
25 large body of evidence before this Board that an

1 cumulative effect can be just about anything.

2 Cumulative effect is the sort of language
3 that everybody is using and it is used to describe
4 every possible environmental impact. I'm not just
5 talking about those just associated with timber
6 management, but we hear about it all the time and one
7 impression that could be taken from the evidence is
8 that it is very simple to talk about cumulative effects
9 and much more difficult to do something with them or
10 about them.

11 Just so we can understand clearly with
12 respect to soils and site protection, could you give
13 examples of cumulative effects associated with soil
14 site degradation?

15 THE WITNESS: Yes, I will on a fairly --
16 what I would think to be a simple version.

17 If I may address the first part of your
18 statement. It's quite true that it appears to -- it is
19 a very widely used term. It depends on what you are
20 trying to look at with regards to site degradation and
21 impacts.

22 An example is that if you have a defined
23 watershed and you're ground base logging it and you are
24 having road construction, landings, the soil compaction
25 associated with both, the exposing of the mineral soil,

1 that specific operation, they open up and increase the
2 opportunity for surface soil erosion to occur.

3 If you start adding, you know, that
4 impact, you are getting more erosion than was there
5 before, more sediment delivery than there was before
6 and it is added not just from one block, but from
7 several or more blocks over, if you want, a period of
8 time. It is the joining together specifically as that
9 sediment comes together and enters the system. It can
10 then affect water quality resources.

11 I'm not an expert on once the sediment
12 gets into the system, but that from my end and dealing
13 with the process of getting the sediment into the
14 stream, that is really what it is.

15 You can then look whatever at specific
16 parameters, whether -- for Vancouver we were looking
17 specifically at water quality in regards to meeting
18 municipal drinking water standards and that was our
19 only focus. There was no issues with regards to fish
20 habitat or anything else. It was: Does this meet
21 drinking water standards and that's how we were rating
22 it. So we were framing our model and our view in a
23 very specific one impact.

24 MR. O'LEARY: Q. Dr. Carr, are there
25 other jurisdictions in Canada or North America of which

1 you are aware that have a similar concern about
2 cumulative effects?

3 MR. FREIDIN: I think the witness should
4 be limited to talking about cumulative effects on the
5 productivity of soils as opposed to cumulative effects
6 on aquatic habitat. We have got Mr. Krochak coming in
7 Panel 5 and other experts who can deal with that and
8 have the expertise to deal with that.

9 MR. O'LEARY: Well, Madam Chair, the
10 witness just said a second ago that he is not a
11 specialist in what happens after the sedimentation gets
12 into the water. He is not professing to be an expert
13 in biology and I don't understand what Mr. Freidin's
14 concerns are.

15 MADAM CHAIR: What's your question, Mr.
16 O'Leary?

17 MR. O'LEARY: I want to know if there are
18 other jurisdictions in Canada or North America that
19 have the same concern about cumulative effects as they
20 have in B.C., if it recognized as a concern elsewhere.

21 MADAM CHAIR: Defining that as being with
22 respect to...

23 MR. O'LEARY: The definition of
24 cumulative effects which Dr. Carr has explained through
25 his witness statement and his evidence.

1 MADAM CHAIR: With regard to site
2 degradation and soil...

3 MR. O'LEARY: And soil erosion.

4 MADAM CHAIR: All right. Go ahead, Dr.
5 Carr.

6 THE WITNESS: Thank you. There are other
7 jurisdictions that require cumulative effect assessment
8 before in dealing with evaluation of options.

9 The U.S. Forest Service is required to
10 undertake a cumulative effects approach through timber
11 harvest planning. There are a variety of systems out
12 there to be used, but they must undertake it.

13 The Bull Run watershed that supplies
14 Portland is required by their charter, and really the
15 legislation because that is a federally regulated
16 watershed, that in undertaking any timber harvesting
17 operations they must view all the options, they must
18 look at the consequences and make a prediction as to
19 the impacts, then they use the various predictions to
20 select the harvesting operations that they are to
21 undertake and they have a very solid, very extensive
22 monitoring program.

23 MR. O'LEARY: Q. Dr. Carr, as a result
24 of the concern that you have indicated exists in
25 British Columbia, can you tell us what activities have

1 occurred or are underway or are planned in relation to
2 these cumulative effects in terms of any analysis or
3 modelling?

4 A. There is a substantial amount of
5 effort going into cumulative effects monitoring -- or
6 not monitoring, but modelling and analysis. In British
7 Columbia, the Department of Fisheries and Oceans, as I
8 mentioned, is working with the Forest Service to come
9 up with some, is a widely researched issue and it just
10 depends on the scale and really the accuracy of the
11 type of model that you wish.

12 From an operational basis, you would be
13 looking -- you may be willing to accept a little more
14 variability than if you were a detailed researcher
15 where you wanted a much more absolute scientifically
16 precise and accurate definition. There is work going
17 on on both aspects in trying to deal with operational
18 models and research models.

19 Q. Is there any requirement that these
20 steps be taken as yet and, if so, at what level are the
21 steps proposed to -- or to be undertaken?

22 Is it done -- at what level done? Is it
23 done at a watershed level, is it done on a particular
24 unit level?

25 MR. FREIDIN: I think he should be asked

1 if there is a requirement first. I think you have to
2 ask that first. The question is assuming it's done.

3 MR. O'LEARY: Yes.

4 MADAM CHAIR: Thanks for the
5 clarification, Mr. Freidin.

6 MR. FREIDIN: He is leading the witness
7 by saying: Tell us where it is done. That's assuming
8 that it is done.

9 He asked the right question yesterday and
10 that is, is there any requirement that these steps be
11 taken. We need an answer to that, and if they are
12 taken, then he can go on and provide the details.

13 MADAM CHAIR: You have got Mr. Freidin's
14 approval to ask your question, Mr. O'Leary.

15 MR. FREIDIN: I think Mr. O'Leary agreed.

16 MR. O'LEARY: Thank you, Dr. Carr.

17 Q. Would you kindly answer Mr. Freidin's
18 question? Do you want me to repeat it?

19 A. We now have Mr. Freidin's question.
20 Why don't you give me the -- there were two questions
21 in your...

22 Q. The first is, is it a requirement?

23 A. It is a requirement as I stated with
24 the U.S. Forest Service and also as part of that there
25 is even a -- they also regulate the Portland watershed

1 and they are required. Yes, there is a requirement.

2 Q. All right. That's in the United
3 States?

4 A. Yes.

5 Q. How about in British Columbia?

6 A. No, there is not a requirement at
7 this time.

8 Q. You made mention to the Portland
9 watershed. Is that the level that it is applied at?

10 A. It can be applied at a various range
11 of scale of watershed. It is always at a watershed
12 level.

13 The Portland watershed is around 16,000
14 hectares, although there are efforts to put it in
15 within British Columbia to begin developing the effects
16 of not only timber harvesting, but all aspects on the
17 Fraser River system which is very substantial. There
18 are also efforts at very small scale detailed,
19 experimental watershed experiments. So it can be
20 applied at a range.

21 Q. Have there been any recommendations
22 made in British Columbia in respect of what level or --
23 yes, in respect to the level that the analysis should
24 be applied?

25 A. The main recommendation that I'm

1 aware of in British Columbia at this time of saying
2 undertake this type of analysis did arise from the
3 Greater Vancouver watershed review to address the
4 entire watershed and that is 52,000 hectares and
5 includes three separate major drainages.

6 Q. Can you tell us, Dr. Carr, what
7 aspects of watershed disturbances caused by timber
8 management activities lead to cumulative watershed
9 impacts?

10 A. The principal aspects relate to the
11 erosion components of adding sediments to the water,
12 adding nutrients to the water and not only the heavier
13 sediments, but also suspended sediments with regards to
14 how they affect the light levels.

15 Q. All right. Moving on to question No.
16 27 on page 17 of the witness statement, you make
17 reference to the universal soil loss equation in the
18 middle of the first paragraph.

19 Can you explain for the Board what
20 universal soil loss equation is?

21 MR. FREIDIN: What page?

22 MR. O'LEARY: It is question 27 at page
23 17.

24 MR. FREIDIN: Thank you.

25 THE WITNESS: The universal soil loss

1 equation is a predictive equation or model to estimate
2 the amount of erosion that would occur off of a given
3 piece of landscape that would be subject to some form
4 of -- either some form of development that would expose
5 mineral soil as applied to agricultural, forestry,
6 range lands, muncipal development; a wide range.

7 There are a number of modifications of
8 the universal soil loss equation since it was
9 originally designed and has been applied to many
10 fields, but it is the fundamental basis behind most of
11 the watershed models that deal with soil erosion
12 prediction.

13 Q. All right. Dr. Carr, can you tell us
14 how that would be applied?

15 You have asked us to prepare a copy of a
16 document and if you feel so inclined to refer to this I
17 might point it out to you and perhaps you can direct
18 the Board's attention to those portions you feel it
19 appropriate.

20 I am referring to an article by --

21 A. Burns and Hewlett?

22 Q. Yes, Burns and Hewlett entitled A
23 Decision Model to Predict Sediment Yield From Forest
24 Practices.

25 A. That may help everybody.

1 MADAM CHAIR: Mr. O'Leary, can you remind
2 the Board, is your client recommending that the
3 Ministry of Natural Resources use such a prediction
4 model?

5 MR. O'LEARY: Yes, we are. That's the
6 Coalition's position.

7 MADAM CHAIR: Thank you.

8 This will be Exhibit 2049. Could you
9 identify it, Dr. Carr, just for the court reporter.
10 The title and the date and so on.

11 THE WITNESS: Yes. A Decision Model to
12 Predict Sediment Yield From Forest Practices. The
13 authors are R.J. Burns and J.D. Hewlett. It is
14 published in the Water Resources Bulletin, Volume 19,
15 Issue 1, February 1983.

16 MADAM CHAIR: Thank you.

17 ---EXHIBIT NO. 2049: Excerpt from a document entitled
18 A Decision Model to Predict
19 Sediment Yield From Forest
20 Practices, authored by R.J. Burns
and J.D. Hewlett, dated February
1983.

21 THE WITNESS: The article that you have
22 demonstrates how the universal soil loss equation can
23 be used in predicting sediment from various timber
24 harvesting practised options.

25 This is just one of many models that are

1 out there that use it, but one that has been shown to
2 be fairly effective.

3 In the equation that you can see on the
4 second right-hand side of the page is specifically the
5 modified version of the universal soil loss equation
6 which they use in their model.

7 If you were to follow the process
8 through, they look at, in dealing with predicting the
9 outcome from various timber harvesting operations, the
10 amount of area that would be susceptible. They look at
11 the rainfall, the climate data, the rainfall index, the
12 R value which we discussed yesterday, the inherent
13 erodibility of the soil, the length and the steepness
14 of the slopes that are involved and the type of
15 management practices or cropping practices as it is
16 traditionally called in agriculture and really looking
17 at conservation practices.

18 This is then looking at a proposed
19 option, the location, the size of the openings, the
20 amount of roads, the amount of exposed soil and make an
21 estimate and make a prediction of amount of sediment
22 that would occur from the area.

23 In this particular model they have
24 incorporated a sediment hazard index to account for the
25 fact that you get erosion, but it really doesn't become

1 a problem from water quality until that erosion has
2 reached a stream. So only a certain percentage of that
3 which erodes on the block may get into the water source
4 and they rate that.

5 This then, you will see, is a prediction
6 of so many tonnes per acre or so many tonnes per
7 watershed that would be yielded.

8 Then you can look at another scenario, a
9 different number of roads, a different harvest practice
10 and make another prediction and go, this one predicts
11 350 tonnes, this one predicts seven tonnes per, you
12 know, per drainage. I think we will take -- then you
13 have something to make your decision on.

14 MR. O'LEARY: Q. Thank you. Dr. Carr,
15 you also state in question 28 that there are a number
16 of erosion prediction models that have been applied to
17 forest manager activities.

18 I should indicate that actually I moved
19 on to question 28 -- or 27 before, but it is on the
20 same page.

21 Again, you indicate that there are a
22 number of erosion prediction models. Can I ask you
23 what specific models you were referring in the witness
24 statement?

25 A. There are a wide range of models that

1 are out. The Burns, Hewlett model is just one.

2 Q. That's the one you just referred to?

3 A. That's the one I just referred to.

4 There are a number of other models, almost sometimes an
5 endless number, that maybe for ease of going through
6 and not boring you with a list of names, on page 2 and
7 3 -- I believe we have this.

8 Q. Are you referring to the Land
9 Management Report?

10 A. Land Management Report 63. We have
11 already discussed that. On pages --

12 Q. Sorry, I will just identify it. It
13 is marked as Exhibit 2047 and it is a document entitled
14 Basic Soil Interpretation for Forest Development Plan
15 and you are referring us now to page 2 and 3, Dr. Carr?

16 A. To page 2 and 3, yes. There is a
17 very brief overview and review of some of the systems
18 that are currently available for erosion prediction
19 with regards to timber harvesting operations. It's a
20 very limited number. I was just trying in this article
21 to select several that looked as though they had some
22 validity with regards to the project that we were
23 undertaken at the time.

24 There are also models available -- one in
25 the U.S. Forest Service that was developed by Glen

1 Klock. That is used extensively in the Oregon and
2 Washington area.

3 The selection of the model depends upon
4 the scale for which you are trying to deal with the
5 issue, the particular parameter that you want to
6 measure and the database that you have available to
7 make that decision.

8 Q. Dr. Carr, do you have an opinion as
9 to whether some or all of these models would have any
10 value in terms of timber management planning?

11 A. All of -- well, as much as I am
12 familiar with them, all of them would have a value by
13 the fact that they are predictive models that can
14 utilize the data base you have available and give you a
15 quantitative prediction which you can then subsequently
16 verify by a monitoring operation.

17 Q. You use the word "quantitative
18 prediction" in your last oral response. That also
19 appears on page 17 in your response to question 28.

20 I wonder if you could elaborate a little
21 more on that and advise us what you mean by - and I am
22 referring to your witness statement - true quantitative
23 prediction?

24 A. In the witness statement, when I
25 wrote true quantitative prediction, I was looking at it

1 from the perspective of a scientist having not only a
2 precise estimate, but also an accurate estimate to be
3 right. The level of precision and accuracy is
4 dependent upon the model, validity of the assumptions
5 in it and the database you have available.

6 Q. All right. Further on in your same
7 response you state that:

8 "The new watershed erosion prediction
9 project currently in the final phases of
10 development in the United States has
11 specifically addressed forest land
12 activity."

13 You go on to say:

14 "In my opinion this model holds the best
15 potential for quantitative erosion
16 prediction in the forest environment."

17 Can you tell us a little more about this
18 watershed erosion prediction project?

19 A. (indicating)

20 Q. You are referring us to a document?

21 A. I would like to refer to the Journal
22 of Soil/Water Conservation, January, February, 1991
23 volume. Do we have pages 34...

24 MR. O'LEARY: Unfortunately the photocopy
25 is not the best.

1 THE WITNESS: I will check. Does it say
2 a generation of erosion prediction technology?

3 MR. O'LEARY: It would appear. Yes, I
4 think I can make out a 37. So it starts at page 34,
5 Madam Chair.

6 THE WITNESS: 34, 35, 36, 37.

7 MR. O'LEARY: To 44.

8 THE WITNESS: Oh, we carried on. There
9 are two articles.

10 The first one is the one that would give
11 you an idea of what the WEPP project, the watershed
12 erosion prediction project is. There have been in the
13 past identified a number of limitations to the
14 universal soil loss equation-based models as we have
15 improved in technology and capability to measure and
16 estimate erosion. It has been found in many instances
17 to be lacking, and the WEPP reject arose from that -
18 that was initiated in the U.S. - to try to improve the
19 predictive capability of for sediment -- for erosion
20 prediction.

21 It is a very major undertaking in the
22 U.S. I believe it is going for a 10-year program. The
23 summary is there for you to read when you find time
24 amongst all the other papers that have been given to
25 you.

1 MADAM CHAIR: Excuse me, Dr. Carr. Where
2 did you say the -- geographically where is this project
3 being done in the States?

4 THE WITNESS: This project is being
5 conducted all voer the United States and being exported
6 also outside of the United States to look at soil
7 erosion.

8 They are ready to deliver the initial
9 phase of the program and distribute it throughout the
10 United States for more validity testing. They have
11 gone around and dealt with a number of the factors.
12 They have portable rainfall stimulators that they have
13 taken around to try to give a better determination of
14 not only the -- of the process of soil erosion and then
15 they use this to improve the prediction capability. So
16 the area base is the entire U.S.

17 MADAM CHAIR: Who is the sponsoring
18 agency?

19 THE DEPONENT: The sponsoring agencies
20 are the U.S. Department of Agriculture, The Soil
21 Conservation Service, the Forest Service, which is also
22 part of the USDA and the Bureau of Land Management.
23 It's an inter-agency project.

24 One of the reasons that I stated that I
25 felt that it had a lot of potential in the future for

1 dealing with the forest land issue is that the
2 universal soil loss equation was derived for
3 agricultural purposes and has modified and at times
4 probably stretched to try and accommodate the forest
5 land development and the inception of -- I was at one
6 of the early meetings when they announced the WEPP
7 project. Through the participation of the U.S. Forest
8 Service they were going to try to accommodate forestry
9 component much more effectively.

10 MADAM CHAIR: But the gist or the
11 emphasis on the watershed erosion prediction project is
12 for agricultural lands?

13 THE DEPONENT: The early version of it
14 seems to be more directed to agricultural and range
15 lands. They have -- or at least when I was at the
16 meeting all of us involved in the forestry were going:
17 Yes, about time. We will have to see what the final
18 product is like.

19 MADAM CHAIR: Okay.

20 MR. O'LEARY: Madam Chair, perhaps we
21 could produce a copy of that document that Dr. Carr has
22 referred to and have it marked as an exhibit.

23 It is entitled -- the acronym is WEPP. A
24 New Generation of Erosion Prediction Technology. An
25 article by John Laflen, Leonard J. Lane and George R.

1 Foster and the pages we are reproducing are 34 through
2 38. I would ask that be given an exhibit number.

3 MADAM CHAIR: Yes, that will be Exhibit
4 2050.

5 ---EXHIBIT NO. 2050: Excerpt from a document entitled
6 WEPP, A New Generation of Erosion
7 Prediction Technology authored by
John Laflen, Leonard J. Lane and
George R. Foster.

8 MR. O'LEARY: Q. Dr. Carr, do you have
9 an opinion as to the reasonableness of preparing a
10 watershed level analysis of cumulative effects as part
11 of timber management planning?

12 A. Yes. I personally feel that it
13 should be a component of the forest management planning
14 procedure as it is a requirement, you know, in light of
15 the fact that it is required in U.S. jurisdiction.

16 I think from what I have been able to see
17 in my visitations down to Oregon and Washington that it
18 has become a very valuable tool to the forest planner.

19 It has also been used to assist forest
20 development in areas that may be -- that are
21 contentious as far as: Do you log in there or not and
22 what are the impacts, to assist in not only proper
23 planning, but also in gaining public acceptance that
24 what is being done is correct or is the best available
25 option, specifically the work that was done in Portland

1 on the Bullrun watershed where they went through a
2 number of potential scenarios, looked at the risks
3 involved and were able to come out with an action plan
4 which they subsequently have implemented.

5 There was a great deal of public
6 sentiment against any logging in the watershed, but that
7 has been overridden by the need to do some form of
8 timber extraction really due to an extensive blow down
9 area, but the fact that they can do it and at least
10 minimize the impacts and begin to design their erosion
11 control, their protection measures around that level of
12 sediment movement.

13 MADAM CHAIR: Do you have any evidence
14 that soil erosion is a problem in the area of the
15 undertaking with respect to timber harvesting
16 practises?

17 THE DEPONENT: I have no evidence with
18 regards to the area of the undertaking.

19 MADAM CHAIR: Mr. O'Leary?

20 MR. O'LEARY: Thank you.

21 Q. Dr. Carr, you said earlier today that
22 the impacts -- perhaps I will just follow-up with your
23 last response.

24 Dr. Carr, are you aware of or familiar
25 with any areas where there has been soil erosion that

1 have topography or terrain like that of the area of the
2 undertaking in this hearing as a result of timber
3 management activities?

4 A. Yes, I do, in reading and my
5 understanding of the type of topography, the
6 ecosystems, the forests that you have and the
7 comparability to parts of British Columbia which I have
8 already discussed, the similarity.

9 I have seen first -- not only seen
10 firsthand, but have dealt extensively with the repair
11 of the damage from soil erosion from timber harvesting
12 activities and it is a very extensive problem even on
13 gentle flat areas.

14 Prince George, in particular, has a very
15 gentle -- it would have been interesting to show you
16 picture, but a very gentle, rolling terrain where a
17 main line and forest road was put in and we had had
18 discussions with the engineers at the time to undertake
19 some erosion control activities with regards to the cut
20 banks and the ditches and no actions were taken. It
21 was just sort of a lot of discussion.

22 It was a very silty material. When we
23 came back at looked at it the next year the road
24 ditches were six feet deep where they had initially
25 only been just a nominal one or two feet deep and

1 subsequently about \$25,000 just to rebuild that section
2 of road alone before implementing an erosion control
3 program. It became very evident.

4 Unfortunately, not only was there greater
5 cost incurred, but there was a substantial amount of
6 material that was deposited into a very small stream
7 and subsequently into sort of a marsh, swamp wetlands.

8 MADAM CHAIR: Go ahead, Mr. O'Leary.

9 MR. O'LEARY: Mr. Martel looked like he
10 was going to ask a question. I apologize.

11 Q. Dr. Carr, you stated earlier today
12 that the impacts of site degradation and in particular
13 erosion and sedimentation can extend beyond the area
14 disturbed by timber management activities.

15 My question is, do you have any estimate
16 or can you give us any advice as to how beyond the area
17 of activities such sedimentation and erosion can carry?

18 A. The sediment can carry a great
19 distance, several kilometres easily in many cases,
20 beyond the actual area of origin, say, from a cut
21 block. So they can be very extensive.

22 It depends on the size of the area
23 disturbed, it depends upon the capability of the site
24 to deliver the sediment, how much rainfall you get, how
25 many streams you have, that sort of thing, but it can

1 be very, very far down.

2 I was involved on the Fish/Forestry
3 Interaction Program which is a piece of the subset
4 operation of the B.C. Forest Service Research Branch
5 and I was dealing with the upland impacts of timber
6 harvesting and looking at the amount of material that
7 could potentially be there, be eroded, and there was a
8 great deal of work that was being carried out down at
9 the mouth of the river to deal with rehabilitating the
10 area, the stream, the spawning beds, and that would
11 have been probably six kilometres just from one area of
12 operation.

13 MR. MARTEL: How much rainfall are we
14 talking about occurring in the areas you are
15 discussing, Dr. Carr?

16 THE DEPONENT: The latter one was on the
17 Queen Charlotte Islands. The area is in the wet belt
18 in this particular study and I would estimate the Sands
19 Pit which is close by gets somewhere around 60 inches
20 of rainfall.

21 MR. MARTEL: I guess what I am having
22 difficulty with is trying to assess whether this is
23 happening in Ontario.

24 We have had all kinds of site visits and
25 we allowed people to pick the sites we would go and

1 see. If one looks west of Thunder Bay, I guess the
2 annual amount of rainfall couldn't be more than 15, 20
3 inches, I would think. That would be excessive for
4 Thunder Bay.

5 I think we are talking there -- a friend
6 of mine tells me that it is almost arid west in terms
7 of the amount of rain, maybe 10, 12 inches beyond
8 Thunder Bay and north.

9 I am just wondering, are we looking at
10 very drastically different conditions in the area that
11 you are familiar with and the area that we are looking
12 at, if we can try and compare B.C. to what's happening
13 in Ontario?

14 THE DEPONENT: As I stated earlier, B.C.
15 has the two dramatic components.

16 The first example that I gave you of
17 coming out of Prince George with a logging road is on a
18 much lower rainfall area than the Queen Charlotte
19 Islands.

20 As well, a lot of the areas outside of
21 Kamloops and Vernon. These are very arid, really high
22 desert areas, are very susceptible to erosion. It is
23 not that you have to have a lot of rainfall. If the
24 rainfall comes all at one time the soil --

25 MR. MARTEL: But I am looking at all the

1 factors. I just used rainfall as one of them, Dr.
2 Carr.

3 THE DEPONENT: That's fine.

4 MR. MARTEL: I am just trying to get a
5 handle on it because as we asked the various parties to
6 this hearing where they would like us to visit, and we
7 flew and took all the parties with us on four or five
8 occasions, I am trying hard to recall where we saw any
9 amount of erosion from roads, from harvest.

10 I mean, we were looking for that and we
11 didn't -- I'm not sure if we were looking at the right
12 stuff. It becomes very difficult when you ask parties
13 to present it and not much evidence is shown over a
14 four-year period.

15 THE DEPONENT: I understand the dilemma
16 that you are in. Not having seen the area, I can't say
17 whether you saw good, bad or indifferent.

18 Even on agricultural land, very flat,
19 tilled areas, there is a potential -- a substantial
20 impact of soil erosion and as you get steeper, say,
21 with road cuts, it is very high.

22 I was at an erosion conference several
23 years ago in Reno, Nevada and we are dealing -- they
24 were presenting papers specifically with the problems
25 of erosion in their more desert ecosystems and desert

1 areas and it was substantial.

2 Without studies having been done and you
3 just may not have the database available there is no --
4 you have just done some tours without anybody
5 quantifying, measuring. I don't know how you can make
6 a judgment.

7 An example. When I began some of my
8 first work, it was to look specifically at soil erosion
9 from forest roads and by everybody I had told: Don't
10 worry about it, it's not there, it's not significant.

11 This is published in the Journal of Soil
12 and Water Conservation where we measured over one
13 winter the change of slope profile and it was only 2.5
14 centimeters, just under an inch, but when we looked at
15 it cumulatively over the length of that road it
16 translated to about 200 to 250 cubic metres of sediment
17 projection in one winter.

18 That's the problem of scale. People see
19 a mass wasting, but it is difficult to look at a slope
20 and see just what one or two centimetres worth of
21 material from this location that is then transported
22 down over a long line. That's a substantial amount and
23 it can be very difficult to see.

24 So back to the problem in Ontario. I
25 don't know of any studies that have been done and I

1 personally can only assume that if you have exposed
2 mineral soil, the slopes and rainfall, that there would
3 be some level of surface erosion occurring whether or
4 not it was at a level to cause harm to a waterbody
5 would depend upon, again, the scale and also the
6 sensitivity of the waterbody to the sediment.

7 You may have to wrestle with, do you have
8 enough data to even make the assumption that it's not.

9 MADAM CHAIR: Mr. O'Leary, shall we move
10 on.

11 MR. O'LEARY: Thank you, Madam Chair.

12 Q. Dr. Carr, have you had an opportunity
13 to review the Fish Habitat Guidelines which have been
14 marked as Exhibit 303 in this hearing?

15 A. Yes, I have.

16 Q. All right. Can you tell me what
17 factors govern or control the movement of eroded
18 material into water courses?

19 A. Could you be more specific as to what
20 you are getting at? We have discussed --

21 Q. I think we just have our wires
22 crossed here. Just a second.

23 Are you familiar, Dr. Carr, with the
24 provisions of the Fish Habitat Guidelines in respect of
25 how they were control the movement of eroded material

1 to prevent it from entering water courses?

2 A. Yes, I am.

3 Q. All right. Can you list for us the
4 factors that govern or control the movement of eroded
5 material?

6 A. There are a number of factors that
7 govern or control the movement. There is the slope,
8 the rainfall, the particle size that you're dealing
9 with, the amount of run-off that you get, the buffering
10 capability of the existing vegetation to either take
11 all or part of that material out of the -- to filter it
12 out effectively. There are a number of issues that are
13 involved there.

14 Q. All right. In your opinion, do these
15 guidelines adequately deal with the cumulative
16 watershed effects that you discussed?

17 A. No, they don't. The guidelines deal
18 more specifically with the use of buffer strips around
19 the waterbody to control the impact of sediment
20 movement. As I've stated, it's not just the material
21 that's local. There is material that is brought down
22 from farther out into the system.

23 Also, a lot of the impact and a lot of
24 the erosion that takes place, when it occurs, comes due
25 to a major rainstorm and while buffer strips may be

1 able to deal with some level, it is quite often when
2 you start getting channelized flow or a lot of water
3 concentrated carrying a lot of sediment that buffer
4 strips become relatively ineffective particularly in a
5 major storm type event.

6 MADAM CHAIR: Dr. Carr, did you review
7 the guidelines on road access and water crossings and
8 the Code of Practice for Riparian Areas?

9 THE DEPONENT: I've looked at them, yes.

10 MADAM CHAIR: Was it your opinion that
11 these also provide no protection -- no effort is made
12 to prevent soil erosion or deal with it if it should
13 occur?

14 THE DEPONENT: Not no effort. There are
15 lists of best management practices very similar to many
16 other jurisdictions in trying to address the issue.

17 The question that was put forward to me
18 is: Are they adequate to deal with the cumulative
19 effects, and just being best management practices it
20 helps, but it doesn't deal with the fact that they tend
21 to be very concentrated around the roads, your road
22 crossings or streams.

23 It really doesn't address the issue back
24 up in the watershed where you are generating sediment.
25 It's more trying to deal with it in a lower level and

1 not prevent it from happening in the first place.

2 MADAM CHAIR: What do you mean 'back up
3 in the watershed'?

4 THE WITNESS: Further back. By back up
5 in the watershed, that is where many times your
6 operations are far away from the stream, that is where
7 the exposed material is.

8 MADAM CHAIR: There aren't many
9 operations in the area of the undertaking that are very
10 far away from a waterbody.

11 THE WITNESS: Then that makes them a
12 little more local. You don't want to deal with
13 material in trying to stop it as a last gap measure.
14 You want to deal with the material on site and stop it
15 from even getting into the process anyhow.

16 MADAM CHAIR: Go ahead, Mr. O'Leary.

17 MS. SEABORN: Excuse me, Madam Chair. I
18 don't want to interrupt Mr. O'Leary, but I just want
19 the Board to be aware, certainly from my client's
20 perspective, the Fish Habitat Guidelines were not
21 something that we were given notice of or prepared to
22 speak to in cross-examination with this witness.

23 It wasn't a document, and Mr. O'Leary,
24 correct me if I am wrong, that was on the list of the
25 exhibits that were reviewed by this witness and I am

1 not sure about the situation with the Code of Practice.

2 Certainly, on the initial list of
3 exhibits reviewed, it was not included either,
4 otherwise I may have had some questions to ask this
5 witness in relation to those documents, but I am not
6 prepared to proceed.

7 MADAM CHAIR: Thank you, Ms. Seaborn.

8 MR. O'LEARY: That's correct, it is not
9 on the list of exhibits as identified in the update
10 that we provided today, but it is I think a valid
11 question and I am in your hands on that one, Madam
12 Chair.

13 MADAM CHAIR: I think we should move on,
14 Mr. O'Leary, and see where we are going.

15 I know that Ms. Seaborn is only
16 interested in cross-examining on the terms and
17 conditions--

18 MS. SEABORN: Once we reach that.

19 MADAM CHAIR: --to which Dr. Carr will be
20 addressing some of his comments.

21 MR. O'LEARY: I appreciate that. The
22 only concern I have is there might be a couple of
23 questions simply arising out of the questions of
24 yourself and Mr. Martel now that you have raised the
25 issue, and I wonder if it would be appropriate to ask

1 several and perhaps we could clarify what Dr. Carr's
2 evidence is on the point.

3 MADAM CHAIR: I don't know how much
4 clarification is necessary. Dr. Carr's evidence is
5 that he believes various policies and procedures with
6 respect to timber management planning in Ontario are
7 not adequate towards preventing soil erosion. That's
8 what you said to us. I don't see that that needs any
9 clarification.

10 MR. O'LEARY: Except in this case we are
11 talking specifically about the cumulative effect.

12 MADAM CHAIR: Well, we can dance all
13 around the cumulative effects stuff.

14 Go ahead, Mr. O'Leary. If you have a
15 question about cumulative effects, go ahead.

16 MR. O'LEARY: I will move on. I think
17 that's the best advice.

18 Madam Chair, if you gave us a few minutes
19 we may be able to expedite this.

20 MADAM CHAIR: That would be a good idea.
21 Why don't we take our afternoon break. We are about
22 two minutes shy of that. We will be back in 20
23 minutes.

24 ---Recess at 2:35 p.m.

25 ---On resuming at 3:00 p.m.

1 MADAM CHAIR: Please be seated.

2 MR. O'LEARY: Madam Chair, we thrashed
3 and burned and we are down to just several more
4 questions you will be pleased to hear.

5 MADAM CHAIR: Good, Mr. O'Leary.

6 MR. O'LEARY: Q. Dr. Carr, I understand
7 you brought with you an article, a 1957 article
8 authored by Trimble and Sartz?

9 A. Yes, I have.

10 Q. And you have a copy of that article
11 with you?

12 A. Yes, I do.

13 MR. O'LEARY: For identification, Madam
14 Chair, a copy has been put before you, the Journal of
15 Forestry, Official Organ of the Society of American
16 Foresters and the article is How Far From a Stream
17 Should a Logging Road be Located, by George R. Trimble
18 and Richard S. Sartz.

19 Q. I don't believe there is a date on
20 this, but Dr. Carr, am I incorrect in my estimate that
21 it is 1957?

22 MADAM CHAIR: It says May 1957.

23 MR. O'LEARY: All right.

24 MADAM CHAIR: The last page.

25 THE WITNESS: Then you are correct in

1 your assumption.

2 MR. O'LEARY: Q. Have you had an
3 opportunity to review this article, Dr. Carr?

4 A. Yes, I have.

5 MADAM CHAIR: Do you want this to be an
6 exhibit, Mr. O'Leary?

7 MADAM CHAIR: Exhibit 2051.

8 ---EXHIBIT NO. 2051: Excerpt from a document entitled:
9 Journal of Forestry, Official
10 Organ of the Society of American
11 Foresters, authored by George R.
Trimble and Richard S. Sartz.

12 MR. O'LEARY: Q. Dr. Carr, do you have
13 an opinion as to the methodology and the reliability of
14 the work that's reported in this article?

15 A. Yes, I do. It is obviously a very
16 old article.

17 There was -- the methodology appears to
18 be very cursory or unscientific in its manner of
19 undertaking, and there are even no references even
20 cited in the paper with regards to where the idea of
21 the monitoring or the measurement even came from.

22 In May of 1957 it may have been pretty
23 much state-of-the-art, but it would be I think very
24 crude in terms of the capability of measuring and
25 assessing sediment today.

1 Q. All right. Do you have any proposals
2 that in your view would be more valid in respect of
3 erosion and sediment control than the methodologies
4 referred to in the report or the article by Mr. Trimble
5 and Mr. Sartz?

6 A. There has been a great deal of work
7 on sediment movement through forest lands, on
8 determining and looking at the impact of buffer strips.

9 In Oregon and in other others areas they
10 have taken quite a look at the issue. I would think
11 there would be more relevant information or more
12 up-to-date information available. One of the --
13 particularly from the fact and in addition that this
14 paper was -- this study what was conducted in
15 Pennsylvania and seems to have been transferred a pretty
16 substantial distance in determining or providing a
17 basis for buffer strip determination.

18 The other factor to be considered is that
19 this is looking at a very specific erosion process and
20 in no way addresses what we have been trying to discuss
21 with regards to the larger scale cumulative effects of
22 surface erosion.

23 Q. Dr. Carr, can you briefly describe
24 the scientific methodology that is referred to by
25 Messrs. Trimble and Sartz in the report?

1 MADAM CHAIR: What's the point of doing
2 that, Mr. O'Leary?

3 MR. O'LEARY: Just to identify it and if
4 there were any concern in terms of interpreting it by a
5 layperson it may be that Dr. Carr can assist us in our
6 interpretation of the methodology contained there.

7 MADAM CHAIR: What's the purpose of this
8 1957 article? To show us that things are being done
9 differently and in a better way today?

10 THE WITNESS: There is a substantial
11 advance to it and in reading over some of the evidence
12 that has been presented before you this document has
13 been cited and assisting in the current buffer strip
14 guideline employed in Ontario.

15 Just to to point out that the relevance
16 of this particular document may be questioned as being,
17 you know, state-of-the-art. If you were going to have
18 buffer strip guidelines, there should be at least, I
19 would think, a look at the most current information
20 available, monitoring if anything whether the
21 guidelines are effective and the development of what
22 may be more appropriate guidelines to deal with buffer
23 strips.

24 MS. SEABORN: Madam Chair, I have one
25 objection to this area of questioning, is that it

1 wasn't my understanding that this witness or his
2 witness statement was addressing, in any event, the
3 issue of the size of buffer zones that may or may not
4 be in the guidelines. It's not a topic that I recall
5 being presented as part of this evidence.

6 We have Panel 5 that's dealing
7 specifically with aquatic effects and my recollection
8 is that in that panel there will be discussion of the
9 Coalition's position with respect to the guidelines.

10 MADAM CHAIR: Mr. O'Leary?

11 MR. O'LEARY: Madam Chair, I am
12 satisfied. I wasn't going to ask Dr. Carr any
13 additional questions here, but I have to respond to Ms.
14 Seaborn's objection.

15 This gentleman was qualified as an expert
16 in soil erosion, that's the evidence he is giving, and
17 buffer zones have a direct effect on soil erosion and
18 the prevention of leakage into surrounding aquatic
19 terrain. He is not giving evidence as to aquatic
20 biology. That is going to be the evidence of Panel No.
21 5.

22 MADAM CHAIR: Well, unless you have
23 another point to make, Mr. O'Leary, the Board is
24 satisfied with Dr. Carr's evidence on this article--

25 MR. O'LEARY: I am happy to go on.

1 MADAM CHAIR: --establishing that the
2 world has changed since 1957.

3 MR. O'LEARY: Q. Dr. Carr, have you
4 reviewed the Coalition's terms and conditions 212 and
5 213 which deal with the matter of wood wasteage and the
6 need for a standardized and statistical valid sampling
7 methodology?

8 A. Yes, I have.

9 Q. Do you have a view as to whether it
10 is possible to use the methodology that you have
11 described for the detection and monitoring of site
12 degradation to also measure wood wasteage?

13 A. Yes. It is an issue that is quite
14 current in British Columbia. There is now a
15 requirement for wood wasteage surveys to be conducted
16 on a regular basis.

17 One of the topics that we have discussed
18 in conjunction with the people doing the wood wasteage
19 survey is there is a methodology --

20 MR. FREIDIN: Madam Chair, if I might.
21 Wood wasteage. I don't know where that comes up in
22 this witness' witness statement. In any event, he has
23 not been qualified as an expert in relation to that.

24 We are now getting into areas not even
25 related to forest management which has been widely

1 qualified, but I thought his evidence related to forest
2 management as it relates to soils and soil degradation
3 processes.

4 MADAM CHAIR: What page are we on in the
5 witness statement, Mr. O'Leary?

6 MR. O'LEARY: We are referring to the
7 terms and conditions and, as I indicated to the Board
8 earlier, there are going to be some amendments to the
9 Coalition's terms and conditions and, indeed, this is
10 one of those areas where we feel the evidence of Dr.
11 Carr will be of assistance in helping the Board
12 understand the reason for the amendment.

13 MADAM CHAIR: All right. We are not
14 referring to a page in the witness statement?

15 MR. O'LEARY: In terms of the witness
16 statement -- are you referring to the entire book or
17 just the page?

18 MADAM CHAIR: Just the page. I lost the
19 reference to wood wasteage.

20 MR. O'LEARY: What we are referring to is
21 contained under Tab 6 of the entire exhibit which
22 contains the witness statement and that is the document
23 entitled Measuring Soil Disturbance Following Timber
24 Harvesting and that how relates to a means of auditing
25 and maintaining a control over wood wasteage. It is a

1 question of process as opposed to simply one of
2 expertise.

3 MADAM CHAIR: Well, the Board certainly
4 is interested in the issue of wood wasteage and Dr.
5 Carr's comment, one that has to do with --

6 MR. O'LEARY: That was dealt with in
7 British Columbia.

8 MADAM CHAIR: How you measure wood
9 wasteage in British Columbia. If you could briefly
10 tell us about that.

11 THE WITNESS: I really do not deal
12 directly with wood wasteage surveys. They are
13 undertaken on a regular basis.

14 What we have discussed with that branch
15 of the Forest Service that undertakes the survey is the
16 possible amalgamation that if you are out there doing a
17 survey as part of an audit, why not kill two birds with
18 one stone and we are investigating at this time the
19 merging of the timber harvest survey system and
20 measurement with their standard procedure for measuring
21 waste surveys.

22 That's all I'm trying to get at. There
23 is a system, it's done on a regular basis. It's a
24 requirement that they wood wasteage surveys.

25 With regards to timber harvesting and

1 soil disturbance, we have been discussing the
2 possibility of combining the two at one time to
3 simplify and also to -- you know, the number of surveys
4 that have to be done and to lower the cost. If you are
5 out there walking across the block it is not
6 necessarily just to gather up one type of data. That's
7 all we were going to get at.

8 MADAM CHAIR: Thank you.

9 MR. O'LEARY: Q. Just a couple of more
10 questions, Dr. Carr.

11 In response to questions 58 and 59 in the
12 witness statement which deal with the matter of
13 determining when a site is free of site degradation
14 impacts, the issue was put to witnesses for the Ontario
15 Forest Industries Association in Volume 201 of the
16 transcript at page 35,595 through to 35,958.

17 Do you have a copy of that volume of the
18 transcript with you?

19 A. Yes, I do.

20 Q. Have you had an opportunity to review
21 those pages?

22 A. I've looked at those pages, yes.

23 Q. All right. Have you also had an
24 opportunity to read page 198 of the Timber Management
25 Planning Manual which is referenced at page 35,596 of

1 these transcripts?

2 A. Yes, I have.

3 Q. And that for identification purposes
4 is marked as Exhibit 7 to these proceedings.

5 Can you tell me, if as a result of a free
6 to grow survey a tree has reached a height, a current
7 height growth and the previous year's height growth
8 standards set out in Table C.1, can you draw a
9 conclusion that the site is now free from all
10 degradation impacts?

11 A. If the survey covers at least the
12 first 10 years of tree growth and was growing at
13 adequate standards that were valid across a wide range
14 of sites, and I would assume that that is the case in
15 these standards, I'm not challenging them, then I think
16 it's fair to say that the tree is not affected by site
17 degradation.

18 If the survey is undertaken in a shorter
19 period of time, the evidence and the research that I
20 have personally done and in conjunction with Forestry
21 Canada has shown that it can often be later that the
22 influence of degradation is expressed in terms of tree
23 growth.

24 So if you are looking as far -- I have a
25 feeling if after 10 years you are really not able to

1 discern the impact there probably is not a significant
2 impact, but if you are looking at what we found in
3 British Columbia, what we were looking at were initial
4 regeneration surveys which are typically taken after
5 five years, that this survey did not adequately deal
6 with the issue of the delay in the expression of the
7 impact.

8 MR. O'LEARY: Madam Chair, unless you
9 have any additional questions or, Mr. Martel, that's
10 the evidence-in-chief.

11 MADAM CHAIR: Thank you, Mr. O'Leary.

12 Ms. Seaborn, are you going to want to
13 cross-examine Dr. Carr?

14 MS. SEABORN: Perhaps, Madam Chair, if I
15 could just address a question to Mr. O'Leary in the
16 context of terms and conditions maybe it will determine
17 if I have any questions for this witness.

18 Madam Chair, the witness statement
19 indicates that the terms and conditions that refer to
20 this area of evidence are terms and conditions 195 to
21 199.

22 Mr. O'Leary, I take it that in terms of
23 how site degradation would be planned for in the
24 context of the Coalition's planning process that topic
25 will be dealt with in your Panel 9 evidence?

1 MR. O'LEARY: Yes.

2 MS. SEABORN: Given that answer, Madam
3 Chair, my interest is more in the aspect of how this
4 would fit into the overall planning process in terms of
5 the steps that would be required by the plan author and
6 the planning teams in terms of looking into these
7 matters. So I will reserve my questions to Panel 9.

8 MADAM CHAIR: All right. Thank you, Ms.
9 Seaborn.

10 Mr. Freidin?

11 MR. FREIDIN: Can I have a moment. I
12 want to change place with my friends, if I might,
13 please.

14 MADAM CHAIR: Mr. Freidin?

15 CROSS-EXAMINATION BY MR. FREIDIN:

16 Q. Dr. Carr, if I might, I would just
17 like to ask you a few short questions about your
18 background as summarized in Tab No. 1. Are you a
19 registered professional forester?

20 A. I am not a registered professional
21 forester. I'm certified -- I'm classified as a
22 forester in training with the association.

23 Q. What's the difference between a
24 forester in training and a registered professional
25 forester in relation to the association of British

1 Columbia of Professional Foresters Association?

2 A. I'm not allowed to sign any type of
3 documents. It's a requirement that after completion of
4 education that you have two years of experience, field
5 experience, and take a forest policy exam to become
6 registered.

7 Q. All right.

8 A. I have not.

9 Q. Which of those requirements have you
10 not met, the field experience, the policy or both?

11 A. I've not written the policy exam. I
12 have qualified for it actually quite a while ago, but
13 my work schedule does not or has not made it easy for
14 me to take the exam and I have insisted that they tend
15 to have -- they have the exam just before Thanksgiving
16 and as a consultant that is my business field season.

17 Q. Okay. In terms of some of the
18 articles, you took us through the reports and
19 publication which start about two or three pages into
20 your curriculum vitae - page 4 actually - and I went
21 through those, and would it be fair to summarize the
22 articles which you highlighted as being ones related to
23 the rehabilitation of landings.

24 A. Some of them, yes.

25 Q. Are there any that you specifically

1 refer to that deal with other than the restoration of
2 lands?

3 A. Yes, there are.

4 Q. I will widen that to say roads and
5 landings?

6 A. Yes, they are.

7 Q. I am looking just at the ones you
8 highlighted for us. Which ones of the ones you
9 highlighted for us relate to those other areas, please?

10 A. You will have to familiar -- tell me
11 which ones you are talking about because --

12 Q. Okay. Start on page 4, Arnott, the
13 first one?

14 A. That dealt with landings.

15 Q. Page 5, the first one, Carr, 1989?

16 A. That dealt with rehabilitation of
17 landings.

18 Q. The third last Carr on the page,
19 1987?

20 A. That dealt with landings.

21 Q. The fourth last Carr on the next page
22 dealing with disturbed slopes in the Queen Charlotte
23 Islands?

24 A. That dealt with the watershed and
25 landings were not the object there.

1 Q. That was on the coastal rain forest
2 that you discussed with Mr. Martel briefly?

3 A. Yes, it is.

4 Q. And the second -- the one under that,
5 severely degraded forest soils. That was your Ph.D
6 thesis?

7 A. Yes, it is.

8 Q. What about that one, did that deal
9 with more than roads and landings?

10 A. No, it didn't.

11 Q. The other ones you highlighted, going
12 on to page 8, 1990 Basic Soil Interpretations for
13 Pre-Harvest Silvicultural Planning. I guess that's one
14 of the document which is attached to your witness
15 statement?

16 A. Yes, it is.

17 Q. That will speak for itself. The next
18 one, Lewis and Carr, 1990, that's Tab 7. So that will
19 be speak for itself as well?

20 A. I believe so.

21 Q. The Greater Vancouver Regional
22 District on page 9, what about that one?

23 A. What is your specific question with
24 regard to that?

25 Q. Does it deal with more than roads and

1 landings?

2 A. Yes, it does.

3 Q. I think you described that in your
4 evidence?

5 A. I believe I did.

6 Q. Okay, thank you. Could you turn to
7 Exhibit 2048. It's the little map of the various
8 physiographic region of British Columbia.

9 A. Yes, I can.

10 Q. As I understand your evidence, the
11 work that you have done and the primary research and
12 investigations regarding these soil degradation
13 processes took place in the area that you have
14 described I believe as the interior plateau?

15 A. That's where a great deal of it has
16 been, although I have done work in the great plains,
17 the coastal and the Columbia Mountains in the southern
18 Rockies.

19 Q. I took it from your evidence that the
20 large majority of your work and the work of others was
21 in the interior plateau?

22 A. The northern portions of the interior
23 plateau.

24 Q. Thank you. Just looking at that, I
25 take it, Dr. Carr, that you are familiar with Rowe's

1 Forest Regions of Canada?

2 A. I have read it, yes.

3 Q. When did you read it last?

4 A. I reviewed it briefly before coming
5 here, but I haven't read it in depth probably since the
6 university days.

7 Q. Would you agree with me, sir, that it
8 is an authoritative text in relation to the subject
9 matter that appears in the title and that is The Forest
10 Region of Canada?

11 A. Yes, I would.

12 Q. I am going to give you a copy of page
13 Roman numeral V which is the Forward to that particular
14 publication.

15 Is it fair to say that this particular
16 authoritative text describes the different forest
17 regions of Canada in relation to the following
18 parameters at least, the following parameters being
19 soils, geology, climate and physiography?

20 A. To the best of my knowledge from the
21 last time I read it those topics are included.

22 Q. And physiography includes the subject
23 matter of patterns of terrain?

24 A. As I understand it, yes.

25 MR. FREIDIN: Can we make that an

1 exhibit, Madam Chair?

2 MADAM CHAIR: Yes, Mr. Freidin. Exhibit
3 2052. Will you have other excerpts from this book?

4 MR. FREIDIN: Yes.

5 MADAM CHAIR: Shall we put them all under
6 the same exhibit?

7 MR. FREIDIN: Sure.

8 MADAM CHAIR: This will be A and it is
9 page Roman numeral V, the Forward?

10 MR. FREIDIN: Yes.

11 ---EXHIBIT NO. 2052A: Page V, the Forward, of Rowe's
12 Forest Regions of Canada.

13 MR. FREIDIN: Q. Would it be fair for me
14 to assume, Dr. Carr, that those particular parameters
15 were identified because those are the factors which
16 influence forests and forest conditions?

17 A. Yes, they are factors that influence
18 forest conditions.

19 Q. I am going to put up for you, Dr.
20 Carr, a map which accompanied Rowe's Forest Regions of
21 Canada and I am going to ask you some questions about
22 that.

23 MADAM CHAIR: Did you say Rows?

24 MR. FREIDIN: R-o-w-e-s, apostrophe S.

25 MADAM CHAIR: Thank you.

1 MR. FREIDIN: Madam Chair, I apologize we
2 don't have an extra copy of that. In the front of the
3 text, you may be able to follow this. It is a
4 reproduction of that, Mr. O'Leary, it just doesn't have
5 the numbers on it.

6 MR. O'LEARY: Do you have another copy
7 for us?

8 MR. FREIDIN: No, we don't.

9 MADAM CHAIR: We can see the map, Mr.
10 Freidin.

11 MR. FREIDIN: Q. Dr. Carr, just so we
12 know what we are looking at here, can you come up for a
13 moment.

14 Could you just with you finger outline
15 the westerly boundary of British Columbia on that map?

16 A. (indicating)

17 Q. It starts down in the right-hand
18 corner near where there is brown and rust area by the
19 No. 2, somewhere around there?

20 A. Someplace pretty close. (indicating)

21 Q. All right, thank you.

22 MR. FREIDIN: I am going to leave that
23 there in case you want to look at it.

24 Q. Now, would you agree, Dr. Carr, that
25 most of British Columbia is a different colour than the

1 colour that covers that part of Ontario which is in the
2 area of the undertaking?

3 A. Yes, it is.

4 Q. I note that there is a greater
5 diversity in terms of the number of different forest
6 regions in British Columbia than in the area of the
7 undertaking. Would you agree with that?

8 A. Yes, there are.

9 Q. Can you explain why that is the case?
10 Why are there more forest regions in British Columbia?

11 A. British Columbia has a very wide
12 variety of terrain and topography changes, a number of
13 mountain changes. It is a much more diverse landscape.

14 Q. You made a comment in your evidence,
15 Dr. Carr, about physiographic regions and the
16 comparison of the physiography of this portion of
17 British Columbia that you have referred to in your
18 evidence and the area of the undertaking.

19 I want to show you a reproduction of page
20 158 of this authoritative text on the subject matter.

21 MADAM CHAIR: Do you want the map to have
22 an exhibit number, Mr. Freidin?

23 MR. FREIDIN: Yes, maybe you can make the
24 map.

25 MADAM CHAIR: It will be 2052B and this

1 will be 2052C.

2 MR. FREIDIN: I am going to give you page
3 158 and page 159 and I would ask that be made the next
4 exhibit.

5 MADAM CHAIR: Pages 158 and 159 of Rowe's
6 Forest Regions of Canada will be 2052C.

7 ---EXHIBIT NO. 2052B: A map which accompanied Rowe's
8 Forest Regions of Canada.

9 ---EXHIBIT NO. 2052C: Pages 158 and 159 of Rowe's
10 Forest Regions of Canada.

11 MR. FREIDIN: Have those been marked as
12 an exhibit, Madam Chair, pages 158 and 159?

13 MADAM CHAIR: Yes, we have marked it as
14 Exhibit 2052C.

15 MR. FREIDIN: Thank you.

16 Q. Would you agree, Dr. Carr, that this
17 publication in terms of the subject matter of the
18 physiographic regions of Canada indicates that there
19 are no similarities whatsoever between British Columbia
20 and the area of the undertaking in Ontario when, in
21 fact, looking at them in terms of major physiographic
22 regions?

23 A. At the scale of this broad ranging
24 document, yes.

25 Q. You think it's important when dealing
with subject matter of soil degradation that we should

1 get down to a little more detailed or refined level of
2 comparison, do you?

3 A. Yes, I do.

4 Q. Dr. Carr, as I recall your
5 evidence -- sticking with physiography, are you
6 familiar with the Atlas of Canada published by the
7 Department of Agriculture?

8 A. Not to my knowledge, no.

9 Q. Pardon me, Phillip's Atlas of Canada
10 and The World?

11 A. No, I'm not.

12 MR. O'LEARY: Madam Chair, I was
13 wondering if Mr. Freidin might give me some indication
14 of when he notified us that these documents were going
15 to be put to the witness in cross-examination.

16 MR. FREIDIN: I didn't notify you that I
17 was going to put these documents to the witness. This
18 expert witness is an expert in soils and so far he has
19 indicated he is familiar with these particular
20 documents. I don't see the witness indicating that he
21 has any problem with this.

22 MR. O'LEARY: We are on to our forth map
23 and you are now pulling out the atlas for -- you say it
24 is Canada and for all I know it may the atlas of the
25 world.

1 MR. FREIDIN: I will refer to the
2 sections on British Columbia and Ontario that this
3 witness has indicated are similar.

4 MR. O'LEARY: Well...

5 MR. FREIDIN: If he can't deal with the
6 maps, Mr. O'Leary, I would be very surprised.

7 MR. O'LEARY: Madam Chair, I stood down
8 earlier today when Ms. Seaborn made reference to the
9 fact that we did not indicate in our list of the
10 exhibits that would be referred to today and what's
11 good for the goose is good for the gander, in my
12 respectful submission, and that the same rules should
13 be applied throughout in this hearing.

14 MR. FREIDIN: Well, you can deal with it,
15 Madam Chair.

16 MADAM CHAIR: The Board hears your
17 objection, Mr. O'Leary. If Dr. Carr at any time feels
18 that he is not familiar enough with these maps or not
19 in a position to respond he can tell Mr. Freidin.

20 MR. O'LEARY: Thank you. Madam Chair, it
21 wasn't just maps I was referring to. I see of bunch
22 of document there beside Mr. Freidin.

23 MADAM CHAIR: It is a practice at this
24 hearing if the witness is given any sizable documents
25 to read we will make time to do that.

1 MR. O'LEARY: Thank you, Madam Chair.

2 MR. FREIDIN: Q. Dr. Carr, I am going to
3 show you a map that appears on page 110 of this book
4 that I am showing you, Phillips Atlas of Canada and the
5 World.

6 I was wondering whether or not based on
7 your knowledge of that document or based on your
8 knowledge of British Columbia whether, in fact, the
9 physiography as shown in that map appears to fairly
10 represent the physiography of British Columbia?

11 MR. O'LEARY: Sorry, I just missed the
12 reference to where that map was taken from, Mr.
13 Freidin.

14 MR. FREIDIN: Page 110 from Phillip's
15 Atlas of Canada and the World.

16 MR. O'LEARY: And of the world.

17 THE WITNESS: In preparing for this I
18 reviewed many documents. This type of -- if you want
19 me to look at that and compare it I would prefer to do
20 it after having a chance to look at it and spend time
21 with it.

22 MR. FREIDIN: All right. I will leave
23 that with you, sir. I do have copies of this.

24 MR. FREIDIN: Madam Chair, I only made
25 limited copies. So if I could make one an exhibit and

1 one could be used by the Board.

2 MADAM CHAIR: This will be a new exhibit
3 number?

4 MR. FREIDIN: Yes.

5 MADAM CHAIR: Exhibit 2053 will be page
6 110 of Phillip's Atlas of Canada and the World.

7 ---EXHIBIT NO. 2053: Page 110 of Phillip's Atlas of
8 Canada and the World.

9 MR. MARTEL: I didn't hear your answer,
10 Dr. Carr. You are not familiar...

11 THE WITNESS: I have not seen this. I
12 would like time to look at this type of information.

13 MR. FREIDIN: I would also then give you
14 a --

15 THE WITNESS: It is just a map showing
16 location. There is no key as to what it is trying to
17 depict.

18 MR. FREIDIN: There is a key in the
19 left-hand side.

20 THE WITNESS: But that is a key of
21 elevation.

22 MADAM CHAIR: Mr. Freidin, Mr. Martel has
23 made the suggestion that if you could give Dr. Carr all
24 the documents and maps and so forth that you referred
25 to in your cross-examination now that we could conclude

1 today. You have got 20 minutes left and then tomorrow
2 we can start with a real bang.

3 MR. FREIDIN: Sure.

4 MR. O'LEARY: Madam Chair, I know it is a
5 normal rule and one that I stand by and that is that I
6 am not allowed to discuss matters with my witness
7 during the course of cross-examination, but prior to
8 his appearance here, if these document had been given
9 on time, I would have been able to review them at least
10 to get a sense of what they are about and assist him in
11 the preparation for cross-examination.

12 Now my friend is producing it at the last
13 minute and I have not had a chance to look at it.

14 Are you going to allow me to speak to the
15 witness?

16 MR. FREIDIN: No, sir.

17 Madam Chair, if I might, I submit quite
18 strenuously this witness is under cross-examination,
19 this witness has been put forward as an expert on
20 soils. He has given expert evidence that he knows what
21 the terrain of British Columbia is and, more
22 particularly, he has said unequivocally that it is
23 similar to Ontario, that we can made results there
24 directly applicable here.

25 Now, that is his evidence. I want to

1 test this witness' credibility and his ability to give
2 that evidence without the assistance of counsel and if
3 he can't deal with my questions appropriately --
4 well, forget whether he can or not, you should have the
5 advantage to see whether he can deal with my questions
6 appropriately and without the assistance of counsel.

7 It is highly inappropriate in these
8 circumstances that there be any contact whatsoever
9 between Dr. Carr and anybody connected with OFAH.

10 MR. O'LEARY: With respect, Madam Chair,
11 I agree with the majority of what my friend says. He
12 is entitled to question this expert witness on all
13 aspects of his case, but within the rules and the rules
14 are there and they are designed to be applied to
15 everyone.

16 That means that these documents should
17 have been produced two days ago. The witness said he
18 needs time to look at them, there is no key. I see
19 none there. I see an elevation which goes from 1,000
20 to 3,000 feet and you are expecting him to give expert
21 evidence on this and not an opportunity to review the
22 documents in advance with the assistance of counsel.

23 I think it is perfectly appropriate and
24 in order, Madam Chair, respectfully that you allow us
25 to discuss whatever further documentation my friend is

1 about to produce with this witness in preparation for
2 term. We have barely begun.

3 MADAM CHAIR: The suggestion from the
4 Board has been that in fact Mr. Freidin will provide
5 all documentation to your witness and you may also have
6 a copy, of course, Mr. O'Leary. If there isn't enough
7 you can have the Board copy for tonight.

8 MR. FREIDIN: I think the problem that
9 Mr. O'Leary has is he wants to be able to talk to his
10 witness and the rule has been -- you know, every
11 witness has been given piles of documents the night of
12 their cross-examination and told: Read this and we
13 will ask you some questions about it.

14 If the witness can't answer the question
15 or wants to get some more documents -- I mean, if Dr.
16 Carr wants to get some documents that he can only get
17 from Mr. Hanna he could say: Could you get me this or
18 get me that, I have no problem with that, but no
19 discussion.

20 MADAM CHAIR: We have at this hearing,
21 Mr. O'Leary, only allowed discussion between witnesses
22 and their counsel when under cross-examination that
23 have to do with other matters, not their testimony.

24 MR. O'LEARY: I understand that, but I
25 just feel that the rule is being defeated if this sort

1 of thing is allowed to go on, Madam Chair.

2 MR. MARTEL: We have gone through this
3 hearing where we have given tonnes of material to
4 witnesses to take home at night and not one witness and
5 not one party, every party. In fact, sometimes I felt
6 sorry for the witnesses, the amount of material that
7 was being dumped on them the night before in
8 re-examination.

9 I mean, it's not unusual. If you want to
10 check the transcripts it's over and over and sometimes
11 very voluminous, mounds of material given to a witness
12 to take home and try and digest. I'm sure some of them
13 have had to stay up all night trying to get ready.

14 MADAM CHAIR: Ms. Seaborn?

15 MS. SEABORN: I would like to support Mr.
16 Freidin's submissions on this matter.

17 We can, as Mr. Martel has recalled, think
18 of numerous times where boxes of material were brought
19 into the hearing partway through a cross-examination
20 and, as you have indicated, the witnesses have always
21 been given an opportunity to review those, but that is
22 to be done without the assistance of counsel.

23 MADAM CHAIR: Dr. Carr, what we want to
24 do is make sure you know what you are looking at and we
25 are going to provide at least the next 15 minutes or so

1 before our scoping session at four, and if Dr. Carr
2 needs time beyond that to make sure that he knows what
3 he is supposed to be looking for.

4 MR. FREIDIN: Sure.

5 MADAM CHAIR: If it is taken out of a
6 full document and he needs a key or whatever that he is
7 provided with the full document.

8 MR. FREIDIN: I am going to give him the
9 whole book. He can take this whole book with him.

10 MADAM CHAIR: Give him the page numbers
11 and the maps and so forth, Mr. Freidin, so he is not at
12 a loss.

13 MR. MARTEL: It is for your late night
14 reading.

15 THE WITNESS: Thank you.

16 MR. FREIDIN: I am also going to give you
17 page 104 of Phillip's Atlas of Canada and the World and
18 it in fact is a map of Ontario except for sort of the
19 southwest corner.

20 I can tell you why I am giving you these
21 two, you can probably imagine why I am giving them to
22 you, I want you to look at those and I want you to tell
23 the Board what those maps tell us about the
24 similarities or the differences between the
25 physiography of the area of the undertaking and the

1 area of British Columbia that you are talking about in
2 your evidence.

3 MR. O'LEARY: Do you have a copy of that
4 for us as well?

5 MR. FREIDIN: Yes.

6 MADAM CHAIR: Mr. Freidin, do you want
7 exhibit numbers for Phillip's Atlas of Canada and the
8 World?

9 MR. FREIDIN: We can mark them
10 tentatively, Madam Chair.

11 MADAM CHAIR: Exhibit 2053A will be page
12 110 and Exhibit 2053B will be page 104.

13 ---EXHIBIT NO. 2053A: Page 10 of Phillip's Atlas of
14 Canada and the World.

15 ---EXHIBIT NO. 2053B: Page 104 of Phillip's Atlas of
Canada and the World.

16 MR. FREIDIN: Dr. Carr, seeing you
17 haven't read it for some time, to the extent that you
18 might need it I am just going to leave you with a copy
19 of Rowe's Forest Regions of Canada.

20 THE WITNESS: Thank you.

21 MADAM CHAIR: Mr. Freidin, will there be
22 anymore maps or articles?

23 MR. FREIDIN: Yes. I am going to give
24 you a copy -- you will have all of these now, Dr. Carr,
25 because you have got all the whole book, but I am going

1 to give you a copy of page 160.

2 THE WITNESS: Of which document?

3 MR. FREIDIN: Of Rowe entitled Canada's
4 Major Soil Zones and Regions.

5 MADAM CHAIR: We are stopping with the
6 exhibits right now, Mr. Freidin. We can start
7 tomorrow.

8 MR. FREIDIN: All right.

9 MADAM CHAIR: Let's continue. We will
10 put an exhibit on all these documents.

11 THE WITNESS: Excuse me.

12 MADAM CHAIR: Yes.

13 THE WITNESS: For clarification of the
14 pages you have been providing directly with regards to
15 Rowe, you only handed me these two and the book so far.
16 The paper has been flying at me.

17 MADAM CHAIR: Mr. Freidin, can you --

18 MR. FREIDIN: You should have page --

19 THE WITNESS: Page 160.

20 MADAM CHAIR: Page 158 and 159--

21 THE WITNESS: It is probably hiding under
22 here.

23 MADAM CHAIR: --of Rowe and the last
24 piece of paper you got was page 160 of Rowe and we are
25 going to make this Exhibit 2052D.

1 ---EXHIBIT NO. 2052D: Page 160 of a document entitled
2 Canada's Major Soil Zones and
 Regions, authored by Rowe.

3 MADAM CHAIR: So you have now under
4 Exhibit 2052, Dr. Carr, you have three pages and a map.

5 THE WITNESS: I have with me the Forward.

6 MADAM CHAIR: The Forward, pardon me.

7 THE WITNESS: I have pages 158, 159 and
8 160.

9 MADAM CHAIR: That's correct, and also
10 the map.

11 THE WITNESS: I forgot I have to take the
12 map as well.

13 MADAM CHAIR: That's Exhibit 2052B.

14 MR. MARTEL: We don't have to study it
15 tonight.

16 THE WITNESS: Who doesn't?

17 MR. MARTEL: We don't have to study that
18 tonight.

19 THE WITNESS: I know you don't.

20 MR. O'LEARY: I haven't had to study that
21 since grade 7, sir.

22 MADAM CHAIR: For Exhibit 2053 you have
23 two pages, page 110 of the Phillip's Atlas for British
24 Columbia and page 104 which is Ontario.

25 THE WITNESS: I just want to keep track

1 of what's here.

2 MR. FREIDIN: Now, Dr. Carr --

3 MR. MARTEL: This is a paper war.

4 THE WITNESS: I have to occupy my time
5 tonight.

6 MR. FREIDIN: Q. Dr. Carr, are you
7 familiar with a publication Soils of Canada published
8 by Agricultural Canada?

9 A. I have seen it quite some time ago.

10 Q. How long did you see it?

11 A. I haven't looked at the book for
12 probably several years.

13 Q. What do you mean by several years,
14 are you talk about five or ten years?

15 A. Five years.

16 Q. Is it an authoritative text on the
17 subject matter of soils of Canada?

18 A. I would guess that it is.

19 Q. Would you agree that it is a
20 document, therefore, that would be useful to refer to
21 if one was trying to in fact compare the soils of
22 Canada, particularly the soils in one region to the
23 soils in another?

24 A. Yes.

25 Q. I am going to give you a copy of

Figure 9 which appears in that particular publication.

A. Would it be possible to have the entire publication?

Q. Yes, sir. It is entitled Physiographic Regions of Canada. That's the particular figure that if was going to look at. I am going to give you Volumes 1 and Volumes 2 which is the entire publication.

THE WITNESS: The specific page was?

MR. FREIDIN: It is Figure 9. I am not sure what page it comes from.

THE WITNESS: Volume 1.

MR. FREIDIN: Volume 1.

MADAM CHAIR: This will be Exhibit 2054. One page excerpt --

MR. FREIDIN: Make it A.

MADAM CHAIR: This will be Exhibit 2054A which is a one-page excerpt, Figure 9, from Agriculture Canada's publication Soils of Canada.

---EXHIBIT NO. 2054A: One-page excerpt, Figure 9, from Agriculture Canada's publication Soils of Canada.

MR. FREIDIN: Another document you should look at and we should mark as an exhibit is a map which goes with that particular publication, Soils of Canada. It is a map, Dr. Carr, entitled Soils of Canada. Maybe

1 we should put an exhibit number on it so we will know
2 what it is.

3 MADAM CHAIR: This is Exhibit 2054B.

4 MR. FREIDIN: 2054B?

5 MADAM CHAIR: That's right.

6 ---EXHIBIT NO. 2054B: Map entitled Soils of Canada.

7 MR. FREIDIN: Q. I take it, Dr. Carr,
8 you haven't looked at that map for five years either?

9 A. No, I haven't.

10 Q. This is one document that I wouldn't
11 expect you to be familiar with, Dr. Carr, and I was
12 going to give it to you this evening.

13 It's a thesis -- it an excerpt of a
14 thesis submitted to the Department of Forestry from the
15 University of Toronto in 1978. Its title is Mechanical
16 Site Preparation in the Boreal Forest of Canada with
17 Special Reference to Ontario.

18 A. When you all have it I will -- who is
19 the author?

20 Q. The author is Richard A. Kelertas. I
21 can assit you, I am going to want to ask you some
22 questions primarily about Table No. 12 in that report.

23 MADAM CHAIR: The excerpt consists of
24 pages 99 to 108 inclusive, Mr. Freidin?

25 MR. FREIDIN: I am not sure what pages.

1 MR. O'LEARY: Madam Chair, just one
2 question, and I am doing it now just so you know the
3 point of it.

4 Did you indicate that Dr. Carr would be
5 entitled to inquire with either myself or Mr. Hanna if
6 he needed documentation, say, something from a library
7 because we have now been handed a thesis. If he felt
8 there was something that was necessary to deal with
9 this would we be permitted to go and dig that out for
10 him?

11 In fact, because we have only been
12 provided with an excerpt I am thinking that the entire
13 thesis might be relevant.

14 MADAM CHAIR: Yes, I think Dr. Carr would
15 be able to request that, but, on the other hand, I
16 imagine that Mr. Freidin would provide him -- do you
17 have a copy of the full text of the thesis?

18 MR. FREIDIN: University of Toronto. We
19 can't have access. You would just as easy access to it
20 as we do.

21 MADAM CHAIR: We just have the excerpts
22 here.

23 Mr. Freidin, do you intend for Dr. Carr
24 to read all this or do you just want him to look at
25 Table 12?

1 MR. FREIDIN: Table 12. He may want to
2 read it. I didn't expect that he would have to read
3 any of these things. I thought that he would probably
4 have been familiar enough with these documents and maps
5 that he would be able to answer questions about them
6 without looking at them, but I guess that's not the
7 case.

8 MADAM CHAIR: Well, Dr. Carr, you won't
9 be able to get the rest of this thesis out of the U of
10 T library tonight anyway. Do what you can with looking
11 at Table 12 and inform the Board tomorrow if you simply
12 can't make any comment on it because you need the full
13 text.

14 THE WITNESS: Thank you.

15 MADAM CHAIR: And explain why you can't.

16 THE WITNESS: What is this particular
17 document's exhibit number now?

18 MADAM CHAIR: We haven't given it an
19 exhibit number, but it will be become Exhibit 2055 and
20 you are to look at Table 12.

21 ---EXHIBIT NO. 2055: Excerpt of a thesis submitted to
22 the Department of Forestry from
23 the University of Toronto in
24 1978 entitled Mechanical Site
Preparation in the Boreal Forest
of Canada with Special Reference
to Ontario, authored by Richard
A. Kelertas.

1 MR. FREIDIN: Q. Dr. Carr --

2 MR. O'LEARY: Madam Chair, I am somewhat
3 familiar with the libraries of U of T and I have had
4 some success getting documents past four o'clock. If
5 we were able to find the document, would it be
6 appropriate if we provided that to Dr. Carr?

7 MADAM CHAIR: Yes, I think that would be
8 fine. I just don't want you to go to any unnecessary
9 work if Dr. Carr doesn't need anything other than Table
10 12. That is all I am thinking. I don't want you to
11 waste your time.

12 MR. O'LEARY: I appreciate that. We
13 don't want to do that either.

14 MR. FREIDIN: Q. Do I take it, Dr. Carr,
15 that the documents that you referred to upon which you
16 have given your opinion that Ontario and the area of
17 the undertaking and the area of British Columbia that
18 you have testified to are similar are the documents
19 which are listed as exhibits that you have referred to
20 and which are listed I think behind Tab No. 3?

21 A. I have so much paper to go through.
22 You asked a very broad ranging question.

23 Q. Turn to Tab 3.

24 A. I'm on tab 3.

25 Q. You have listed a number of exhibits

1 that you referred to.

2 A. Yes.

3 Q. Did you refer to any other documents
4 upon which you based your opinion that the areas
5 identified in your evidence from British Columbia are
6 similar to Ontario?

7 A. Yes, I have.

8 Q. Could you list for me the other
9 documents that you referred to or you relied upon?
10 Have any of them been filed as exhibits?

11 A. A page of the Ecosystems of British
12 Columbia which I have used a great deal in this
13 preparation. One page has -- the physiographic page
14 has been submitted.

15 Q. The physiographic page has been
16 submitted. That is the physiographic page, Exhibit
17 2048?

18 A. 2048. That is from this document.

19 Q. All right. Could I have that
20 document to look at tonight or do you need it?

21 A. I will need to deal with this. I
22 only have one copy. Sorry.

23 Q. Okay.

24 A. A portion of the field guide for
25 interpretation and -- Identification and Interpretation

1 of Ecosystems of the BW BSC 1 in the Prince George
2 Forest Region, a portion of that document has been
3 submitted as evidence, but there are also companion
4 documents which have not been.

5 Q. I think that was 2047, was it?

6 MR. O'LEARY: 2045.

7 MR. FREIDIN: 2045. This document?

8 A. Yes. I have looked at both the
9 Forest Ecosystem Classification for Northwestern field
10 guide and the Northwestern Ontario Forest Ecosystem
11 Interpretation. Those are Ministry publications.

12 Q. Yes.

13 A. Also, the field guide for the forest
14 ecosystems of the Clay Belt. I have reviewed them with
15 regards to this issue of ecoclimate regions of Canada.

16 Soil Landscapes of British Columbia --

17 Q. What was it?

18 A. It is called Soils Landscapes of
19 British Columbia.

20 Q. Do you need that book tonight?

21 A. Yes, I do.

22 Q. There is nothing I like more than
23 working late at night.

24 MADAM CHAIR: You are going to have to go
25 to the movies tonight, Mr. Freidin, because you won't

1 have anything to do.

2 MR. FREIDIN: Q. Is there any other
3 document that you relied upon to make that comparison?

4 A. I believe that is the majority of the
5 documents that I can recall at this time.

6 Q. So the only information, then, that
7 you relied upon to make your comparison between British
8 Columbia and the area of the undertaking in relation to
9 forest conditions, particularly soils and topography,
10 were from the Forest Ecosystem Classification documents
11 that you have referred to?

12 That's what I understand your evidence to
13 be.

14 A. As best as I can remember at this
15 moment.

16 Q. That is the only understanding that
17 you really could possibly have of the conditions of
18 Ontario because you have already admitted quite
19 unequivocally I think that you have no experience in
20 this area, the area of undertaking, and you are not
21 familiar with it in any respect?

22 A. That's quite true, I'm not familiar
23 with it in any respect.

24 MR. FREIDIN: I think that would be a
25 good place to stop. Oh, I have a couple more documents,

1 I'm sorry.

2 Q. Are you familiar with any of the
3 silvicultural guides in Ontario?

4 A. No, I'm not.

5 Q. You indicated that there were
6 silvicultural guides in British Columbia. I think you
7 were asked specifically in relation to site
8 preparation?

9 A. There is. Yes, I have that with me.

10 Q. Okay. I take it, then, you weren't
11 suggesting that the silvicultural guides that exist in
12 British Columbia were of the same nature as
13 silvicultural guides in Ontario?

14 A. Not knowing what your silvicultural
15 guides are. It was just mechanical site prep.

16 Q. I am going to give you the entire, if
17 you want, silvicultural guide for the spruce working
18 group in Ontario. It is Exhibit 382. Just so you can
19 get a sense of what a silvicultural guide in this
20 province looks like.

21 I would be interested, Dr. Carr, if you
22 could just provide me with some insight as to how that
23 compares to that silvicultural guide that you were
24 referring to or the silvicultural guide that you
25 understand exists in British Columbia.

1 I don't know whether they are the same or
2 different and anything -- are you familiar enough with
3 the silvicultural guides in British Columbia to be able
4 to make the comparison?

5 A. No, I'm not. I have a field guide on
6 the interpretation -- on the use of mechanical site
7 prep equipment in northern British Columbia and that
8 silvicultural guide deals specifically -- it is a guide
9 to the use of mechanical site preparation equipment in
10 northcentral British Columbia, August 1987.

11 MR. FREIDIN: I will tell you what. I
12 will give you mine and you give me yours because maybe
13 we can -- or you need that I guess to make the
14 comparison.

15 A. If you want me to make a comparison I
16 would like a chance to look at this and try to make a
17 comparison.

18 Q. All right. Sure. I am going to give
19 you a copy of another article. It is an article
20 entitled The Distribution of Slopes in British
21 Columbia. The authors are Peter D. Morrison and
22 Douglas H. Williams.

23 Are you familiar with either of those two
24 gentlemen?

25 A. Not offhand, no.

1 Q. One of them, Douglas Williams, is an
2 adjunct professor at the Faculty of Forestry, UBC.

3 A. Oh, Doug Williams. My apologies. I
4 do know --

5 Q. You know Doug?

6 A. I do know Dr. Williams, yes.

7 Q. Is he somebody whose work you would
8 respect? Do you have enough familiarity with his work
9 to be able to answer that?

10 A. My acquaintance with him. I do not
11 know him as being a soils person. He is involved quite
12 widely in computer systems.

13 Q. Statistical analysis?

14 A. Statistical analysis, yes.

15 MR. FREIDIN: Can I mark that as the next
16 exhibit, please.

17 MADAM CHAIR: Exhibit 2056. It is a
18 13-page article by Morrison and Williams entitled The
19 Distribution of Slopes In British Columbia and the date
20 is...

21 THE WITNESS: Madam Chair, it was 2056?

22 MADAM CHAIR: This would be Exhibit 2056
23 and we are just trying to see when it was written or
24 published.

25 MR. FREIDIN: I will provide you with

1 that information tomorrow. I don't know.

2 MADAM CHAIR: Thanks, Mr. Freidin.

3 ---EXHIBIT NO. 2056: 13-page article by Morrison and
4 Williams entitled The
5 Distribution of Slopes in British
6 Columbia.

6 MR. FREIDIN: I don't think really there
7 is any other paper that I will be referring to. It
8 will all be paper that the witness has already referred
9 to or he is familiar with.

10 MADAM CHAIR: Okay.

11 MR. FREIDIN: I have done my best I think
12 in providing...

13 MADAM CHAIR: Nothing Dr. Carr hasn't
14 seen?

15 MR. FREIDIN: I don't believe so.

16 MADAM CHAIR: All right, thank you very
17 much.

18 We will adjourn for today, Dr. Carr, and
19 will you be able to get that all back to your hotel
20 room? You are welcome to stay and work here.

21 THE WITNESS: Will it be possible to use
22 counsel to help me carry this since I have a lot of
23 material? We will not discuss it except by the shear
24 weight and volume of it.

25 MR. FREIDIN: Ten cents a bag.

1 MR. O'LEARY: I will give him a hand. I
2 just have to discuss the nature of my retainer.

3 MR. FREIDIN: I'm sorry I went by four
4 o'clock, Madam Chair, but hopefully it will go a little
5 more smoothly tomorrow now that Dr. Carr has all the
6 material.

7 MADAM CHAIR: Thank you, Mr. Freidin.
8 Thank you, Dr. Carr. We will be back at nine o'clock
9 tomorrow morning. We are going to have a procedural
10 session now and you are certainly free to leave.

11 THE WITNESS: Thank you.

12 MADAM CHAIR: What we are going to talk
13 about has nothing do with your evidence, but you are
14 invited to stay if you want?

15 THE WITNESS: I'm very tired. I am still
16 working off the West coast time. This three-hour time
17 differential is still wreaking havoc on my system.
18 ---Witness withdraws.

19 MADAM CHAIR: All right. Shall we get
20 started then with our scoping session for the
21 Coalition's witness Panel 5 evidence. The subject of
22 which is the management of aquatic resource impacts.
23 The witness will be Dr. Dennis Krochak.

24 Does anyone know if Forests for Tomorrow
25 will be cross-examining. They have not submitted a

1 statement of issues, have they?

2 MS. SEABORN: (nodding negatively)

3 MADAM CHAIR: Mr. Cassidy has informed
4 the Board they cannot afford to attend the scoping
5 sessions and he may or may not be cross-examining.

6 Mr. Pascoe?

7 MR. PASCOE: I just spoke with Mr.
8 Cassidy and he will not be cross-examining Panel 5.

9 MADAM CHAIR: Mr. Cassidy will not be
10 cross-examining; therefore, cross-examination will be
11 by the Ministry of Natural Resources and, Ms. Seaborn,
12 do you expect your cross-examination, if you do one,
13 will be fairly brief? Do you intend on
14 cross-examining? You have certainly listed issues in
15 the statement.

16 MS. SEABORN: It depends on how the
17 evidence goes in in-chief. Probably a couple of hours,
18 though, on this panel.

19 MADAM CHAIR: All right. Thank you.

20 As the first step in the exercise, we
21 will pose our own questions, Mr. O'Leary, and, Mr.
22 Hanna, that we want Mr. Krochak to consider before he
23 shows up before us.

24 MR. O'LEARY: Okay.

25 MADAM CHAIR: On page 3, the Board notes

1 in the second paragraph, the last sentence that Mr.
2 Krochak refers to "no net loss of habitat will result
3 or that adequate compensation is provided where losses
4 are avoidable."

5 He is referring to the fisheries and
6 oceans policy or is he talking about the proposal by
7 the Coalition for compensation? It wasn't clear to the
8 Board when we read this whether who was -- compensation
9 by whom, to whom, for what. It is not clear to us.

10 On page 16 and elsewhere in the written
11 evidence, we have again this topic of cumulative
12 watershed impacts and it is apparent that Mr. Krochak
13 will be discussing this matter in some detail.

14 We note that he refers to work done at
15 Hubbard Brook in the Carnation Creek studies. We
16 assume that you have prepared him with some of the
17 evidence we have heard about Hubbard Brook and we think
18 particularly of evidence we have heard in the OFIA's
19 case with respect to the experimental design at the
20 Hubbard Brook study site.

21 As well, we would like to hear from Mr.
22 Krochak so that we can understand what he is trying to
23 say to us, we want to hear from him whether he is
24 confident or how confident he is that such cumulative
25 watershed impacts can be, first of all, defined and

1 then subsequently predicted and measured throughout the
2 area of the undertaking.

3 We would appreciate hearing from him
4 examples of which cumulative watershed impacts he is
5 talking about in association with timber management
6 planning in the area of the undertaking and whether he
7 has any evidence that such impacts are occurring.

8 On page 18, Mr. Krochak expresses
9 disagreement with Mr. Ward's conclusion about reserves
10 around lakes as being a positive step.

11 Are there circumstances in which Mr.
12 Krochak believes that it is unnecessary to put a
13 reserve around a lake and is he supporting a position
14 that there not be automatic reserves around lakes in
15 the absence of information as is currently the
16 requirement of the Fish Habitat Guidelines.

17 On pages 25 to 29, there is a discussion
18 of the federal fisheries policy. The Board has -- we
19 have a number of questions about that and we will
20 simply ask Mr. Krochak to think in advance of, does he
21 have any evidence that the Federal Department of
22 Fisheries and Oceans is dissatisfied with or opposed to
23 MNR's timber management planning process insofar as it
24 relates to fish habitat.

25 It seems to the Board that the Federal

1 Department of Fisheries and Oceans would know that this
2 hearing is taking place and they would have perhaps
3 submitted something in writing to the Board or sent
4 someone to speak to the Board or talk to the Board
5 through the proponent or the Ministry of the
6 Environment, but we don't have any evidence that there
7 is any opposition to the way in which the proposed
8 timber management planning system will rely on the Fish
9 Habitat Guidelines.

10 As I said, we have a number of questions
11 and we would simply say that, for example, on page 26,
12 Mr. Krochak identifies three goals of the department's
13 policies and we want to know, how does the Department
14 of Fisheries and Oceans monitor whether they are
15 achieving these goals.

16 The evidence before us is that the
17 federal government relies on the Ministry of the
18 Environment and the Ministry of Natural Resources to
19 carry out or to implement its policies in the province
20 and we want to know whether Mr. Krochak is critical of
21 that, of that system or is he calling for more
22 intervention by the federal department. We are not
23 quite sure what to make of it.

24 On page 27, in the first paragraph with
25 respect to the discussion about the net loss of fish

1 habitat, the Board is curious to know how it is
2 proposed that the Department of Fisheries and Oceans
3 would assess the loss of fish habitat.

4 Is Mr. Krochak saying that, in fact, no
5 one is assessing the actual loss if any is occurring
6 or -- we are not quite clear what he means by that
7 statement. Is he saying MNR should be doing it. It is
8 not clear to us what is meant by that.

9 On page 29, Mr. Krochak makes the
10 statement:

11 "The planning procedure, as I understand
12 it, involves a prediction of impacts on
13 fish habitat and fish populations and the
14 development of objectives for fish
15 habitat and fisheries in timber
16 management plans."

17 We take it that that is how Mr. Krochak
18 has interpreted the Coalition's proposals.

19 We assume Mr. Krochak is familiar with
20 the way the system works now with respect to fishery
21 management plans and he understands how objectives are
22 set in those plans with respect to timber management
23 planning, and we also want to know how realistic and
24 achievable Mr. Krochak believes this work to be.

25 MR. FREIDIN: Which work specifically are

1 you referring to?

2 MADAM CHAIR: The work on predicting
3 impacts on fish habitat and fish populations and
4 development of objectives for fish habitat and
5 fisheries in timber management plans.

6 MR. FREIDIN: Thank you.

7 MADAM CHAIR: Also, this extends to
8 another question we have on pages 35 and 36. On page
9 35, Mr. Krochak advances to the Board the argument that
10 we really need more fisheries biologists active in
11 timber management planning and we want to know whether
12 he has some idea of the number of fisheries biologists
13 we would need to cover a hundred management units,
14 although of course not all of them are active and new
15 timber management plans aren't done every year, but are
16 we talking about dozens of fisheries biologists or a
17 handful or many? We don't know.

18 A related issue on page 36, Mr. Krochak
19 is proposing that there be essentially inventory work
20 and assessments done on waterbodies with respect to
21 fish habitat including waterbodies smaller than 10
22 hectares in size.

23 We examined this evidence, as you recall,
24 Mr. Hanna, again in the OFIA case with respect to the
25 cost of inventory and the number of lakes in Ontario

1 and we would like Mr. Krochak to address how you could
2 do this if you wanted to with respect to the number of
3 waterbodies that would have to be examined and the cost
4 of doing that work.

5 Mr. O'Leary, do you have any questions or
6 does your client have questions to the other parties,
7 to the Ministry of Natural Resources with respect to
8 their statement of issues?

9 MR. O'LEARY: I don't think we have any
10 with respect to the Ministry of Natural Resources, and
11 the MOE as well.

12 MADAM CHAIR: All right. How long do you
13 expect to be in evidence-in-chief, Mr. O'Leary?

14 MR. O'LEARY: I would estimate another
15 day and a half, a day and three quarters.

16 MADAM CHAIR: All right. The Board has
17 noticed, Mr. O'Leary, we were trying to keep the
18 evidence-in-chief to one day and that's obviously your
19 job. It falls on your shoulders to get your
20 evidence-in-chief out in front of the Board as quickly
21 as you can.

22 Certainly we interjected several times
23 with respect to Dr. Carr's evidence and added some time
24 to your examination, but we would like you to move
25 along as quickly as you can. We have great experience

1 in keeping up with the evidence that's put in front of
2 us and don't feel that you can't move pretty quickly in
3 the examination-in-chief.

4 MR. O'LEARY: I will keep that in mind.
5 We will make best efforts, Madam Chair.

6 MADAM CHAIR: So you are expecting a day
7 to a day and half?

8 MR. O'LEARY: Well, we will have to go
9 back and reconsider some of the questioning. I do
10 think we can keep it under a day and a half.

11 MADAM CHAIR: All right, thank you.

12 MR. MARTEL: Mr. Freidin has a question.

13 MR. FREIDIN: No, no. You didn't ask me
14 how long I was going to take in cross.

15 MR. MARTEL: We were saving it.

16 MR. FREIDIN: A day.

17 MR. MARTEL: One day?

18 MR. FREIDIN: Yes.

19 MADAM CHAIR: Ms. Seaborn?

20 MS. SEABORN: About two hours, Madam
21 Chair.

22 Just in terms of timing for starting this
23 evidence, I can't recall whether the estimates for
24 Panel 4 were that all of next week were going to be
25 taken up and whether we were proposing to start this

1 witness next week if we have an extra day or whether it
2 is the week after, at least to start the
3 evidence-in-chief.

4 MR. MARTEL: I think we were worried
5 about trying to bring somebody in from afar for the
6 sake of one day and then have a four-day break.

7 MR. O'LEARY: That's the concern. He is
8 come in from Saskatchewan.

9 MR. MARTEL: So we won't try to start for
10 the sake of one day, I think.

11 MS. SEABORN: So he will start on the
12 Monday, then?

13 MADAM CHAIR: Yes, unless there are
14 objections from the parties.

15 MS. SEABORN: No objection. I just
16 wanted to clarify that.

17 MADAM CHAIR: Yes, that's what we will
18 do. If Mr. Krochak were in town we would ask him if he
19 could make himself available and we could get started,
20 but he is not.

21 Are there any other questions? Anything
22 anyone wants to discuss?

23 (no response)

24 Mr. Freidin, how long are you going to be
25 in cross-examination tomorrow?

1 MR. FREIDIN: It's hard to say. A day,
2 all day.

3 MADAM CHAIR: Most of tomorrow?

4 MR. FREIDIN: Yes.

5 MADAM CHAIR: All right. We will expect
6 you to be finished by four o'clock tomorrow.

7 MR. FREIDIN: If Dr. Carr gives me short,
8 correct answers I will be finished even before then.

9 MR. MARTEL: It was just to see if we had
10 to keep him over an extra day.

11 MADAM CHAIR: For re-examination, would
12 you plan to be -- well, you don't know how long you are
13 going to be in re-examination, Mr. O'Leary.

14 MR. O'LEARY: Judging by what has come in
15 today I may be another day, but I hope not.

16 It's difficult to predict, but I have a
17 firm belief that the re-examination should be very
18 short. I will try and do that.

19 MADAM CHAIR: Okay. Thank you very much.
20 We will see you at nine o'clock tomorrow morning.

21 ---Whereupon the hearing was adjourned at 4:30 p.m., to
22 be reconvened on Wednesday, January 22, 1992
23 commencing at 9:00 a.m.

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